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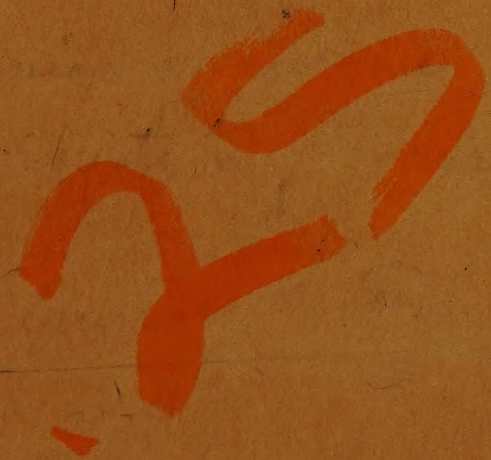

Study Realized v Standard Income (Savings is the deficiency of the former compared with the latter)

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INTRODUCTION TO ECONOMIC SCIENCE

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INTRODUCTION

TO

ECONOMIC SCIENCE

BY

IRVING FISHER

PROFESSOR OF POLITICAL ECONOMY
YALE UNIVERSITY

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To

THE MEMORY OF MY FRIEND

AND COLLEAGUE

PROFESSOR LESTER W. ZARTMAN

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CHAPTER I

WEALTH

§ 1. Definition of Economics and of Wealth

Economic Science, or, as it is often called, Political Economy or Economics, may be most simply defined as the *Science of Wealth.* The purpose of economic science is to show the nature of wealth; the relation of wealth to human wants, and to the satisfaction of those wants; the forms of the ownership of wealth; the method of its accumulation and dissipation; the reasons that some people have so much of it and others so little; and the principles that regulate its exchange and the prices which result from exchange. In a word, everything which concerns wealth in its general sense falls within the scope of economic science.

To most persons the chief interest in the subject lies in its practical applications to public problems, such as those connected with the tariff, trusts, trade-unions, strikes, or socialism. These problems suggest that something is wrong in the present economic order of society and that there is a way to remedy it. Before we can treat of economic diseases, however, we must first understand the economic anatomy and physiology of society; that is, we must grasp the general economic principles which these public questions involve. Hence, the study of economic science must precede the application of that science to problems of public policy. In the end the student will reach more satisfactory conclusions if, at the beginning, he will put aside all thought of such applications, and cease to count himself a free trader or a protectionist, a monometallist or bimetallist, an individualist or a socialist, or indeed, any other kind of partisan.

We must, then, in the first place, distinguish economic science from its applications to public problems; but, in the second place, we must likewise distinguish it from its applications to private problems. Economics does not concern itself with teaching men how to become rich; nor does a practical skill in the art of becoming rich imply, necessarily, a sound knowledge of economics. Economics, it is true, is the theory of business; and business the practice of economics. But, though they are not in the least conflicting, — indeed, to some extent mutually helpful, — they are nevertheless totally different. Some of the wildest economic theories have originated among successful financiers. Men who have been trained in Wall Street are often the most sadly in need of elementary instruction in economics. This is so because the very matters with which people have longest been familiar are frequently the ones which they have been least disposed to analyze. In business theory, no less than in the theory of public problems, men take too much for granted.

Our first rule, then, in approaching the study of economics is to take nothing for granted. It is quite as important to be careful in defining familiar terms, such as "prices" and "wages," as in explaining unfamiliar ones, such as "index numbers" and "marginal desirability."

Having indicated Wealth as the subject matter of Economics, the question at once arises: What *is* Wealth? By Wealth (in its most general sense) is meant *material objects owned by human beings*.[1] Any single such object is an article of wealth, or an *instrument*. In common parlance,

[1] Every writer may define a term as he pleases, except that he should justify his definition in one or both of two ways: (1) by showing that it accords with common practice; and (2) by showing that it leads to useful results. The above definition of wealth meets both of these requirements. It agrees substantially with the usual understanding of business men, and (although it departs from the practice of some economists) it leads to a consistent and systematic development of the science.

Some economists add to the definition that an object, to be Wealth, must

"wealth" is often opposed to "poverty," the contrast being between a large amount of wealth and a small amount; precisely as in common parlance "heat" is opposed to "cold," the contrast being between a large degree of heat and a small degree. But just as in physics ice is regarded as having some degree of heat, so in economics a poor man is regarded as having some degree of wealth.

Wealth, then, includes all those parts of the material universe that have been appropriated to the uses of mankind. It does not include the sun, moon, or stars, for no man owns them. It is confined to this little planet of ours, and only to certain parts of that; namely, the appropriated sections of its surface and the appropriated objects upon it.

§ 2. Distinction between Money and Wealth

One of the first warnings needed by the beginner is that he avoid the common confusion of wealth with money. Few persons, to be sure, are so naïve as to imagine that a millionaire is one who has a million dollars of actual cash stored away; but, because money — or *some* money — is

be useful; thus defining wealth as "useful material objects owned by human beings." But unless a thing is useful no one would care to own it. Nothing is owned which is not useful in the sense that its owner hopes to receive benefits from it, and it is only in this sense that utility is to be employed as a technical term in economics. Therefore, as utility is already *implied* in ownership, it need not be mentioned separately in our definition. Other writers omit the idea of ownership and simply define Wealth as "useful material objects." But this definition includes too much. Rain, wind, clouds, the Gulf Stream, the heavenly bodies, especially the sun, from which we derive light, heat, and energy, are all useful, but are not appropriated, and so are not wealth as commonly understood. Even more objectionable are those definitions of wealth which omit the qualification that it must be material; they do this in order to include stocks, bonds, and other property rights, as well as human and other services. While it is true that property and services are inseparable from wealth, and wealth from them, yet they are not themselves wealth. To include wealth, property, and services, all under one term, involves a species of triple counting. A railway, a railway share, and a railway trip are not three separate items of wealth; they are respectively wealth, a title to that wealth, and a service, or benefit, of that wealth.

a kind of wealth, and because the beginner is so accustomed to measure all kinds of wealth in terms of money, he sometimes forgets that not all kinds *are* money. For an extended study of money, we are not yet ready, but as a warning we shall here enumerate a few of the most common fallacies which beset the subject. The nature of these fallacies the student will understand more fully after they have received a more extended treatment.

First, then, it is sometimes seriously asserted that if one man " makes money," some one else must " lose " it, since there is only a fixed stock of money in the world, and it seems clear that " whatever money the money-maker gets must come out of some one else's pocket." The flaw in this reasoning is the assumption that gains in trade are gains in actual money, so that in every business transaction only one party can be the gainer. If this were true, we might as well substitute gambling for agriculture and for manufacturing; for in gambling the winnings are precisely equal to the losses. But as a matter of fact, it is not in order to obtain money that people engage in trade, but in order to obtain what money will buy, and that is precisely what both parties to a normal transaction eventually get.

Again, some persons have tried to prove that the nations of the earth can never pay off their debts because these debts amount to more than the existing supply of money. This fallacy is due to the fact that debts are merely *expressed* in money. " If we owe money," it is argued, " we can't pay more money than there is." This sounds plausible, but a moment's thought will show that the same money can be, and in fact is, paid over and over again in discharge of several different debts; not to mention that some debts are paid without the use of money at all.

Again, it is sometimes argued that there must be a great deal of " water " in the capitalization of the trusts because their total capitalization exceeds all the money in existence. But we cannot thus infer that the capital of the trusts is so

largely fictitious, for capital and money are by no means the same thing. A cargo of merchandise is capital, but it is not money.

A few years ago at a meeting of the American Economic Association a Western banker expressed the opinion that the total amount of money in the world ought to equal the total wealth of the world; else, he suggested, people would never be able to pay their debts. He explained that in the United States there were twenty dollars of wealth for every dollar of money; and he inferred that therefore there was but one chance in twenty of a debtor paying his debts. "I will give five dollars," he said, "to any one who can disprove that statement." When no one accepted the challenge, a wag suggested that it was because there was but one chance in twenty of getting the promised five dollars!

The attempt to equalize money and wealth by making money twenty times as plentiful would, as we shall see later, prove absolutely futile. The moment you raised the amount of money, the money value of all other forms of wealth would rise in proportion, and there would be the same discrepancy as before.

A very persistent money fallacy is the notion that sometimes there is not enough money to do the world's business, and that unless the quantity of money is then increased the wheels of business will stop or slacken. The fact is, however, that *any* quantity of money, whether large or small, will do the world's business as soon as the level of prices is properly adjusted to that quantity. In a recent article on this subject, an editor of a popular magazine put this fallacy into the very title: "There is not enough money in the world to do the world's work." He says, "The money is not coming out of the ground fast enough to meet the new conditions of life." In reality, money is coming out of the ground too fast and is having the effect of raising prices. This writer contends that the panic of 1907 was due to a scarcity of money, whereas the true explanation lies in the

fact that gold had been pouring out of the mines for so many years and in such large quantities that men were led to use it too freely in speculation, and this inflation of enterprise precipitated an economic crash.

A more subtle form of money fallacy is one which admits that money is not identical with wealth, but contends that money is an indispensable means of *getting* wealth. At a recent meeting of the American Economic Association a very intelligent gentleman asserted that the railways of this country could never have been built in the early fifties had it not been for the lucky discovery of gold in California in 1849, which provided the "means by which we could pay for the construction of the railways." He overlooked the fact that the world does not get its wealth by buying it. One person may buy from another; but the world as a whole does not buy wealth, for the simple reason that there would be no one to buy it from. The world gets its railways, not by buying them but by building them. What provides our railways is not the gold mines but the iron mines. Even though there were not a single cent of money in the world, it would still be possible to have railways. The gold of California enriched those who discovered it, because it enabled them to buy wealth of others; but it did not provide the world with railways any more than Robinson Crusoe's discovery of money in the ship provided him with food. If money could make the world rich, we should not need to wait for gold discoveries. We could make paper money. This, in fact, has often been tried. The French people once thought they were going to get rich by having the government print unlimited quantities of paper money. Austria, Italy, Argentina, Japan, as well as many other countries, including the American colonies, and the United States, have tried the same experiment with the same results, — no real increase in wealth, but simply an increase of the amount of money to be exchanged for wealth.

The idea that money is the essence of wealth gave rise to

a set of doctrines and practices, called Colbertism or Mercantilism, the earliest so-called "school" of political economy. Colbert was a distinguished minister under Louis XIV of France in the seventeenth century, and a firm believer in the theory that, in order to be wealthy, a nation must have an abundance of money. His theory became known as Mercantilism because it regarded trade between nations in the same light in which merchants look upon their business, — each measuring his prosperity by the difference between the amount of money he expends and the amount he takes in. To keep money within the country Colbert and the Mercantilists advocated the policy now known as "protection." To-day it is generally understood that, as between individuals, both nations may gain in an exchange transaction; but the old idea that a nation may get rich by selling more than it purchases, and collecting the "favorable balance of trade" in money, still forms one of the popular bases of protectionism in the United States. The more intelligent protectionists give quite different reasons for a protective tariff, but the old fallacious reason still appeals to the multitude, who continue to think that by putting up a high tariff people are prevented from spending money to the foreigner and compelled to keep it in this country.

In order to avoid money fallacies of the sort we have referred to, what the student should realize is that no technical term in economics should be used as a basis of reasoning without a carefully formulated definition. All catch phrases should be avoided. Especially should the student be on his guard against every proposition concerning money. "Making money," for instance, is a catch phrase used without any definition. Properly speaking, nobody can "make" money except the man in the mint. The rest of us may gain wealth, but, unless we are counterfeiters, we cannot literally "make" money. The propositions which are true of money we shall state carefully in due time. As yet we are not even prepared to define money.

§ 3. Classification of Wealth

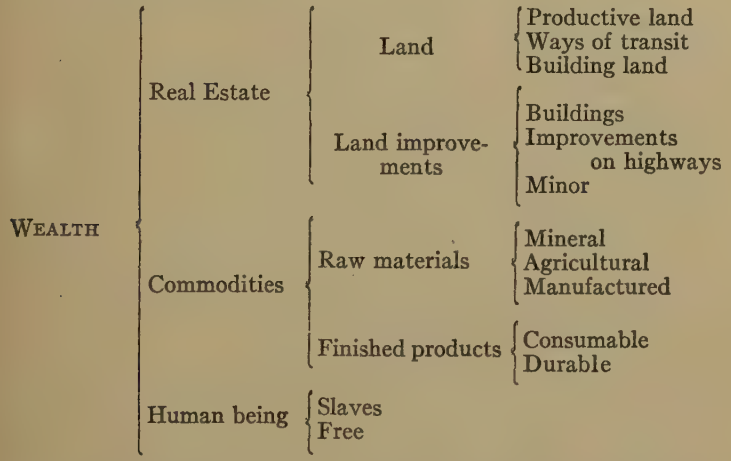
Various kinds of wealth may be distinguished. That wealth which consists of owned portions of the earth's surface is called *land;* fixed structures upon land are called *land improvements;* and the two together, since they constitute *immovable* wealth, are called *real estate.* All wealth which is movable (except man himself) is called *commodities.* There remain, then, *human beings* themselves, — not only "slaves" who are wealth owned by other human beings, but also "freemen" who are wealth owned by themselves.

It is true that in ordinary usage freemen are not counted as wealth. And it must be admitted that, if they are wealth, they are wealth of a very peculiar sort; first, because they are not, like ordinary wealth, bought and sold; secondly, because the owner usually estimates his own value much more highly than does any one else; and thirdly, because the owner coincides with the thing owned. However, it is perfectly logical to make our definition of wealth broad enough to include human beings.[1]

[1] In order to concede as much as possible to popular usage, the following supplementary definition is framed: Wealth (in its narrower sense) consists of "material objects owned by human beings and external to the owners." This definition obviously includes slaves but not freemen. It corresponds closely to the popular use of the term, but it is more difficult of application than the wider definition; for it makes an arbitrary line of demarcation between freemen and slaves, when, in fact, there are several intermediate forms, such as vassals, indentured servants, long-time apprentices, and men held in peonage. A man bound out to service for thirty years is almost indistinguishable from a slave, and if his term of service be long enough, the distinction fades away completely. On the other hand, the shorter the term of service the nearer does his condition approach freedom. As a matter of fact, almost all workers in modern society are bound by contract to *some* extent and for some period of time, even though it be no more than an hour; and to that extent they are not free. In short, there are many degrees of freedom and many degrees of slavery, with no fixed line of demarcation.

The two concepts just mentioned, "wealth in its broad sense" and "wealth in its narrow sense," need cause no confusion. When the simple term "wealth" is used, the *broad* meaning will be understood, and any propositions which

There are of course many admissible ways of classifying wealth. That which follows seeks to exhibit the principal groups into which wealth most naturally falls.[1]



It scarcely needs to be stated that these groups are not always absolutely distinct. Like all classes of concrete things, they merge imperceptibly into each other. For this reason the classification is of little importance in scientific study, except as giving a bird's-eye view of the field of economic science.

§ 4. Measurement of Weath

Having seen what wealth is and what it is not, and having classified it roughly, we shall next examine separately its

hold true of wealth in this meaning will necessarily hold true of wealth in the narrow meaning. Whenever there is occasion to restrict the term, we shall make use of the phrase, "wealth in its narrow sense."

[1] The student need not attempt to learn this classification outright. He should simply become familiar with its chief divisions, studying its details merely as illustrative. It is also advisable that he construct other classifications, of which many are possible.

two attributes, materiality and appropriation, devoting the remainder of this chapter to the first of these.

The materiality of wealth is chiefly important as providing a basis for the physical measurement of wealth. Wealth is of many kinds, and each kind has its own appropriate unit of measurement. Some kinds of wealth are measured by weight. This is true, for instance, of coal, iron, beef, and in fact of most "commodities." Of units of weight, a great diversity have been handed down to us, such as the pound avoirdupois, the kilogram, etc. In England, besides the avoirdupois pound and the Troy pound, and the apothecary's weight, there is the pound sterling, used for measuring gold coin. This is much smaller than any other pound, owing partly to the frequent debasements of coinage that have occurred, and partly to the past change from silver to gold money. In the United States a dollar of "standard gold," or gold which is $\frac{9}{10}$ fine, is a unit of weight, employed for measuring gold coin. It is equivalent to 25.8 grains, or to $\frac{25.8}{7000}$ of a pound avoirdupois, since there are 7000 grains in a pound avoirdupois. We can scarcely put too much emphasis on the fact that the pound sterling and the dollar are units of weight. As units of "*value*," we need not yet trouble ourselves about them.

For many articles it is not so convenient to measure by weight units as to measure by *space units*, whether of volume, of area, or of length. Thus we have, for volume, milk measured by the quart, wheat by the bushel, wood by the cord, and gas by the cubic foot; for areas, we have lumber sold by the square foot, and land by the acre. For length, we have rope, wire, ribbons, and cloth measured in feet and yards.

Many articles are already in the form of more or less definite units. In these cases the measure of their quantity is the number of such units. For instance, eggs or oranges are measured by their number expressed in dozens. Similarly, sheets of writing paper are reckoned by the "quire,"

pencils and screws by the "gross." In such cases the article is said to be measured "by number." But "number" is by no means peculiar to such cases. All measurement implies an abstract *number*, as well as a concrete *unit*. The only peculiarity of measurement "by number" is that the unit, instead of being one which is applied from the outside, as by the yardstick, is one in which the things measured happen to be already divided.

The English pound avoirdupois is the weight of a particular piece of platinum kept in London. A great many copies of it have been tested by balance, so that they weigh almost exactly the same as that pound; but there is, properly speaking, only one standard pound and that is the one in London. So also the kilogram is another piece of metal kept in Paris. These units, like all units, are arbitrary. The definition of an English yard, for instance, is simply an imaginary line drawn between two small dots on gold plugs in a particular brass rod in London.

Having such definitely specified units of measure and a knowledge of the number of times that unit is contained in any given wealth, the amount of that wealth is fully expressed. This assumes that the given wealth is homogeneous, so that all parts of it are measurable in the same unit. If different qualities have to be distinguished, the amount of each quality requires separate measurement. But the existence of a gradation in quality, such as is usually applied to real estate, makes it very difficult to measure wealth in physical units. A tract of land of 100 acres may consist of many different qualities of land, and to include all these as merely so many acres is a misleading measurement. Or, sometimes there is only one article of the particular kind in existence, in which the element of comparison is left out of the measurement. There is but one Battery Park, one White House, one Koh-i-noor diamond, one Rhynd-papyrus.

The unit of measure of any kind of wealth, therefore, when fully expressed, implies a description, not only (1) of

size, but also (2) of quality; as, for instance, a "pound of granulated sugar." It may be necessary to enumerate the particular attributes of the wealth under consideration, or enough of these attributes to distinguish that species of wealth from others with which it might be confused. Thus it is often necessary to specify what "grade" or "brand" is meant, as "grade A," "Eagle brand," "Lackawanna," etc. Sometimes the special variety is denoted by a "trademark" or "hall-mark." It is in this way that the attributes of particular kinds of wealth enter into the consideration of economic science, and not, as some have erroneously supposed, as themselves constituting separate "immaterial" sorts of wealth. "Fertility" is not wealth, though "fertile land" is wealth. The "skill" of a mechanic is not wealth, though the skillful mechanic is wealth.

§ 5. Value and Price

We have considered articles of wealth as measured separately. Each kind has its own special unit, as pounds, gallons, or yards. But it is convenient also to measure the combined *value* of aggregations of wealth. This term introduces the principle of *exchange*. So much mystery has surrounded "value" that we cannot be too careful to obtain a correct and clear idea of it at the outset. In the explanation which follows, the concept of value is made to depend on that of price; that of price, in turn, on that of exchange; and, finally, that of exchange on that of transfer. We must begin, therefore, with transfer.

Wealth is said to be transferred when it changes owners. *A transfer is a change of ownership*. Such a change does not necessarily imply a change of place. Ordinarily, of course, the transfer of an article is accompanied by change in its position, the purchase of tea or sugar being accompanied by the physical delivery of these articles across the counter from dealer to customer; but in many cases such a change

of position does not occur, and in the case of real estate it is even impossible. The distinction between change of ownership and change of position is often overlooked. Exports and imports, for instance, mean change of place; whereas international trade means changes of ownership. Some wealth may be exported, therefore, without being transferred, as when an American going abroad takes his effects with him. On the other hand, wealth may be transferred without being exported, as when, for example, American railroads are transferred in part to foreign ownership, though they cannot be exported. Yet we say that exports and imports must balance each other when we really mean that international trade must balance.

Transfers may be voluntary or involuntary. Examples of involuntary transfers of wealth are: (1) through force and fraud of individuals, as in the case of robbery, burglary, or embezzlement; (2) through force of government, as in the case of taxes, court fines, and eminent domain. But at present we have to do only with voluntary transfers. Voluntary transfers are of two kinds: (1) one-sided transfers *i.e.* gifts and bequests; and (2) reciprocal transfers, or *exchanges*, which are of most importance for Economics.

Exchange, then, means the *mutual and voluntary transfer of wealth between two owners, each transfer being in consideration of the other*. When a certain quantity of wealth of one kind is exchanged for a certain quantity of wealth of another kind, we may divide either of the two quantities by the other and obtain what is called the price of the latter. Thus if 200 bushels of wheat are exchanged for 100 ounces of silver, the price of the wheat is $\frac{100}{200}$ or $\frac{1}{2}$ ounce of silver per bushel. Contrariwise, the price of silver in terms of wheat is $\frac{200}{100}$ or 2 bushels per ounce. Thus there are always two prices in any exchange. Practically, however, we usually speak only of one, viz. the price in terms of money, obtained by dividing the units of money by the units of the commodity.

While it is true that any two kinds of wealth may be exchanged, some kinds of wealth are more acceptable in exchange than others. Money primarily means wealth which is *generally acceptable in exchange*. And here for the first time we reach a definition of money. In other words, the fundamental quality of money is its exchangeability. An exchange in which money does not figure is called *barter*. An exchange in which money does figure is called a *purchase* and *sale*, — a purchase for the man who parts with the money, a sale for the man who receives it. Originally, all exchange was barter, but to-day most exchange is, as we all know, purchase and sale.

In order that there may be a price, it is not necessary that the exchange in question shall actually take place. It may be only a contemplated exchange. A real estate agent often has an "asking price"; that is, a price at which he tries to sell. This is usually above the price of any actual sale which may occur later. In the same way there is often a "bidding price," which is usually below the price of actual sale. Hence, the price of actual sale usually lies between the price first bid and the price first asked. But it sometimes happens that the bidder refuses to raise his bidding price and the seller refuses to lower his asking price enough to bring the two together. In such a case no sale takes place, and the only prices are those bid and asked. For many commodities the trade journals report, preferably, the prices of actual sale; but if there has been no sale, the prices bid or asked, or both.

When there is no sale, especially when there is no price bid or asked, it is not so easy to answer the question, What is the price? Recourse is then had to an "appraisal" which is simply a more or less skillful guess as to what price the article could or should bring. Appraising or guessing at prices is often very difficult. It frequently has to be employed, however, by the government, for assessing taxes and customs duties and condemning land; by insurance

companies for settling claims and adjusting losses; by merchants for making up inventories and similar statements; and by statisticians for numerous purposes. In fact, some people make a living by appraising wealth on which, for one purpose or another, a price of some sort must be set. The purpose evidently makes a great difference in the appraisal. Sometimes we want to know the price for which an article could be sold in an immediate forced sale; sometimes, the price it might be expected to bring if a reasonable time were allowed; sometimes, the price the owner would probably take; sometimes, the price a possible purchaser would probably give. And these prices may be all different. A family portrait may be worth a big price to the owner, and yet bring next to nothing if sold to strangers. The owner would naturally appraise it at a high figure if he wished to insure it against fire, but if he should try to borrow money on it from a pawnbroker, the appraisal would have to be small.

Consequently, in applying an appraisal, we encounter many difficulties because the parties involved usually have some interest to serve. When a farmer has land for sale, he will hold it at a high price to prospective purchasers, but enter it, if the truth must be told, at a low price on the tax list. When a fire loss is adjusted, the two conflicting interests, viz. the "insured" and the "company," are usually represented by two experts who in case of disagreement call in a third.

Having succeeded in obtaining the *price* of any kind of wealth, we may next proceed to compute the *value* of any given quantity of it. *And the value of a given quantity of wealth is that quantity multiplied by the price.*[1] Thus, if the

[1] This definition of value departs from the usage of some textbooks, but follows closely that of business men and practical statisticians. Economists have sometimes confined "price" to what is here called *money* price and applied the term "value" to what is here called price. Other economists have used the term "price" in the sense of market price, — what an article actually sells for, — and "value" in the sense of appraised price or reasonable

price of wheat is $\frac{2}{3}$ dollars per bushel, then a lot consisting of 3000 bushels would have a value of 3000 times $\frac{2}{3}$ dollars or 2000 dollars. In other words, the value of a certain quantity of one kind of wealth at a given price is the quantity of some other kind for which it would be exchanged, if the whole quantity were exchanged at the price set.

The distinctions between quantity, price, and value of wealth may be illustrated by an inventory such as the following:

	Quantity	Price	Value
Shoes	1000 pair	$4\frac{1}{4}$ bu. per pair	4250 bu.
Beef	300 lb.	$\frac{1}{5}$ bu. per pound	60 bu.
Dwelling house .	1 house	10,000 bu. per house	10,000 bu.
Wheat . . .	100 bu.	1 bu. per bushel	100 bu.

In the second column are recorded various quantities of wealth, measured each in its own special unit; in the third column are the prices of these in terms of wheat; while in the last column are their values, also in terms of wheat. The first and last columns of figures represent two different ways of measuring wealth. Statistics of wealth, such as those published monthly by the Department of Commerce, usually give both "quantities" and "values." To translate from one to the other we always need a *price* as a go-between.

It is important not to confuse the columns with one another. The *quantity* of beef is totally different from its *value*, and each of these is different from its *price*. The quantity is here measured in *pounds* of beef, its value in *bushels* of wheat, while its price is measured in *bushels per pound*.

price, — what it ought to sell for. Still others have used the term "price" in the sense employed in this book, but "value" in the sense of the degree of *esteem* in which an article is held, — what in this book will later be called "marginal desirability."

The measurement of wealth in "value" has one great advantage over its measurement in "quantity." It translates many kinds of wealth into *one* kind and thus enables us to add them all together. This is a very useful accomplishment. To add up the second column is quite impossible, because shoes, pounds of beef, houses, and bushels of wheat are incommensurable. But the items in the third column of the inventory, being expressed in a common unit, may be added together, despite their otherwise baffling diversity.

Since prices and values are usually expressed in money, the most exchangeable kind of wealth, therefore money may be said to bring uniformity of measurement out of diversity. In other words it is not only a *medium of exchange*, but it is also a *measure of value.*

Although this reduction to a common measure is a great practical convenience, we must not imagine that it gives what may be called "the true measure" of wealth. In fact, to measure the amount of wealth by its value — *i.e.* its money value — is often misleading. The money value of car wheels exported from the United States in one month was $12,000, and in a later month, $15,000, from which fact we might infer that these exports had increased. But the *number* of car wheels exported in the first of those two months was 2200, and in the second only 2100, showing a decrease. Likewise, the figures for imports of coffee in these periods show a decline in dollars, despite an increase in pounds. It is conceivable that the quantity of every article might decrease, and yet, if the prices increased sufficiently, there would be an apparent increase of wealth when there really was nothing of the kind. Such is apt to be the case in times of an inflation of the currency.

Even when we are confessedly trying to measure the value of wealth and not its quantity, it is difficult or impossible to find a right way. Imports into the United States from Mexico in one year were worth 28 millions

of American gold dollars, and ten years later, their value was 40 millions, — an increase in value of 42 per cent; but these very same imports measured in Mexican silver dollars were 41 millions in the first year and 90 millions in the second, — an increase in value of nearly 120 per cent. These increases do not agree; yet the American merchant reckons value one way, and the Mexican merchant, the other. In a sense both are right; that is to say, both are true statements of the value of the articles imported, one of the value in gold and the other of the value in silver. If the value were measured also in iron, copper, coal, cotton, or any other article, we should have many other different "values," no two of which would necessarily agree. "The value of wealth," therefore, is an incomplete phrase; to be definite we should say, "the value of wealth in terms of gold," or in terms of some other particular article. Hence we cannot use such values for comparing different groups of wealth, except under certain conditions, and to a limited degree. To compare the wealth values of distant places or times, — as America and China, Ancient Rome and Modern Italy, or Carnegie and Crœsus, — will inevitably give conflicting and unsatisfactory results.

§ 6. Limit of Accuracy in Economic Measurements

We have learned how the three magnitudes — quantity, price, and value of wealth — are usually measured, and that their measurement is practically a very inaccurate affair. Yet in the minds of most persons, even of business men, the degree of accuracy attained is exaggerated. Even in the measurement of the mere quantities of wealth there are two sources of error; for every such measurement includes, as we have seen, two elements: a *unit* and a *number* or *ratio*, as the pound, and the number of pounds; and both the unit and the number or ratio may be inaccurate. In modern times the first source of error — the unit — is practically

eliminated. Our units of weight and measure are standardized by law, and a pound in California is, for all practical purposes, equal to a pound in Connecticut. There is, moreover, at Washington a national bureau and a special building for preserving and testing standards of measurement. Different towns have their sealers of weights and measures, to prevent error through ignorance or fraud. But this fortunate condition of affairs did not always exist. The Egyptians are said to have been unable to test their units of length to less than 1 foot in 350. The Roman weights were only true to 1 pound in 50. And when we go back to primitive units, we find that they were very rough indeed. A yard was probably originally the length around the waist, which naturally was apt to fluctuate considerably. So also the distance between the elbow and the end of the finger was taken as a unit and called the ell. Fraud was, therefore, as easy as it was common. At Bergen, in Norway, among other relics of the old Hanseatic League, are the scales used for buying and selling fish, with *two* sorts of weights used, one considerably heavier than the other. The heavier were used for buying and the lighter for selling! Such tampering with weights and measures is now almost unheard of.

To-day the chief error lies not in the unit, but in the ratio of the quantity of wealth to that unit. In retail trade the inaccuracy from this source is very great. If we get our apples or potatoes measured correctly within five per cent, we are fortunate. Wholesale transactions are more accurate. Probably the greatest degree of accuracy ever attained in commercial measurements is on the mint scales employed by the federal government in Philadelphia and San Francisco. These scales weigh accurately to within about one part in ten million.

Besides these two sources of error in the measurement of mere quantity, when we proceed from quantity of wealth to value, we introduce still a third source of inaccuracy, viz. the price factor by which we multiply the quantity in order

to get the value. This is especially true if the price be merely an " appraised " price. The price in an actual sale is an absolute fact and cannot be said to have any inaccuracy; but the price at which we estimate a thing *would* sell under certain conditions is always uncertain. In the case of " staple " articles, *i.e.* articles regularly on the market, a dealer can often appraise correctly within one per cent. Real estate in certain parts of the city where sales are active can sometimes be appraised correctly within five or ten per cent, but in the " dead " or out-of-the-way parts of some towns, where sales are infrequent, the appraisement becomes merely a rough guess. Again, in the country districts, while farms in the settled parts of Iowa and Texas can be appraised within ten or fifteen per cent, in the backward parts even an expert's valuation is often proved wrong by more than fifty per cent. And where a sale of the article in question is scarcely conceivable, an appraisement is almost out of the question. To estimate the value of Yellowstone Park is impossible, unless we allow ourselves an enormous range. Still wider limits must be allowed when we try to value human beings. We can often give a lower limit, but seldom an upper one. The estimates may vary enormously with the point of view It is sometimes said, " If I could buy Mr. So-and-so at my valuation and sell him at his, I'd get rich." It would be erroneous, however, to conclude, as some writers have done, that because we cannot value them accurately, public parks or freemen cannot be called wealth.[1]

[1] When the slaves in the South became freemen, they ceased to be appraised as wealth. The result has been somewhat confusing to our census statistics. The "Manufacturers' Record" of Baltimore recently issued figures showing a sharp drop in the assessed valuations of wealth in the South after the war. The inference was drawn that the value of wealth had immensely decreased; but a large part of this so-called decrease consisted merely in the change of ownership of slaves from their old masters to themselves, and their consequent omission as items of value. Any valuation of freemen should exceed that of slaves; but even on the basis of slave values the total value of the human beings in any country is always greatly in excess of the total value of all other wealth.

CHAPTER II

PROPERTY

§ 1. The Nature of Property

Our definition of wealth restricts it to concrete material objects. According to the definition, wealth has two attributes: materiality and ownership. Its materiality was the subject of the preceding chapter; its ownership will be the subject of the present chapter.

To *own* wealth is to have a right to the *benefits* of wealth, and before proceeding further with the discussion of ownership we must consider the " benefits " of wealth. To own a loaf of bread means nothing more or less than to have the right to eat it, sell it, or otherwise employ it to satisfy one's desires. To own a suit of clothes is to have the right to wear it. To own a carriage is to have the right to drive in it or otherwise utilize it as long as it lasts. To own a plot of land means to have the right to use it forever. The real objects for which wealth and property exist are the *benefits* which they confer. If some one were to give you a thousand dollars on condition that you neither spend them nor give them away, or if some one gave you a house on condition that you never use it, sell it, rent it, or give it away, you would be justified in refusing it as worthless.

Benefits are also called the *uses* or *services* or *work* of wealth. The last two terms are generally employed when the wealth referred to is human beings. Sometimes these benefits consist of positive advantages and sometimes of the prevention of disadvantages. Benefits, then, mean *desirable*

events obtained or *undesirable events* averted by means of wealth.[1] When a loom changes yarn into cloth, the transformation is a desirable change due to the loom; it is a benefit conferred or performed by the loom. The benefit from a plow is the turning up of the soil. The benefits or services performed by a bricklayer consist in the laying of bricks. The benefits conferred by a fence around a farm consist in preventing the cattle from roaming away. The dikes in Holland confer the benefit of keeping out the ocean. The benefits conferred by a diamond necklace consist in its sparkle and the satisfied vanity of the wearer.

To be desirable an article must confer benefits on the owner, but not necessarily on the community at large. For instance, the noise of a factory whistle may be a nuisance to the community, but as long as it is serviceable to the owner of the factory, it is for him a benefit.

Benefits may be measured just as wealth may be measured, although the units of measurement are of course not the same. We measure some benefits by number, — as when we count the strokes of a printing press. We measure other benefits by time, — as when we reckon a laborer's work by the number of hours or days that he is engaged in it. Some benefits of wealth we measure by the wealth which it produces, — as when the work of a coal miner is measured by the amount of coal he mines, or when the use of a loom is measured by the number of yards of cloth it weaves.

When we have measured the benefits of wealth, we may apply to them the same concepts of transfer, exchange, price, and value which, in the last chapter, we applied to wealth. We have seen that wealth may be exchanged. The same is true of the benefits of wealth. But when the benefits of wealth are exchanged, there is really no new kind of exchange

[1] Benefits (or uses) or services must not be confused with the utility (or desirability) of those benefits. The benefits are desirable events; the utility is the desirability of those events. "Desirability" is very important in economics, but does not concern us until Chapter XVI.

taking place. For to exchange *wealth* is really to exchange the benefits of wealth. Under the term " wealth " we really take account of the benefits of wealth. The wealth was the thing explicitly mentioned and measured, but its benefits were included by implication.

Opposed to the benefits of wealth are its costs. Costs may be called negative benefits. The purpose of wealth is to benefit its owner ; that is, to make happen what he desires to happen, and to prevent from happening what he does not desire to happen. But often wealth can work no benefit without entailing some cost ; that is, preventing what is desirable or occasioning what is undesirable. Whatever wealth brings about to the pleasure of the owner is a benefit ; whatever it brings about to his displeasure is a cost. He assumes the costs only as a means of securing the benefits.

As most roses have thorns, so almost every beneficial article has its costs. The benefits from a farmer's land are measured by the crops which that land produces ; the costs it imposes are measured by the labor, trouble, and expense of getting the crops.

The costs of wealth may, of course, be measured, just as its benefits are measured, — by number, by time, or other appropriate units.

§ 2. Rights to Benefits of Wealth

We have said that to own wealth means to have the *right* to its benefits. We have seen what is meant by " benefits " and have next to examine what is meant by " right."

Rights, in the most general sense, are the liberty, under the sanction of the law and society, to enjoy the benefits and assume the burdens of wealth. Lawyers generally distinguish between property rights and personal rights, but to the economist all rights are proprietary. We have already defined wealth in its broad sense as inclusive of persons. Consequently personal rights are but rights to personal

wealth, — just as other rights are rights to other wealth. Logical convenience is therefore served by comprising under the general term of property rights all rights whatsoever. Every right, then, is a right to the benefits from wealth, whether persons or things. For instance, the right to life, liberty, and the pursuit of happiness; or the right of a husband over a wife or of a wife over a husband; or the rights of parents over children or of children over parents, — all these may be regarded as property rights in the broadest sense. It is not often, however, that personal rights will need our attention. It is only as property in human beings enters into commerce that such rights obtrude themselves. When wives were bought and sold, they were thought of as wealth; and the rights of husbands were thought of as property.

The benefits to which a right in wealth entitles its proprietor require time for their occurrence and are either past or future. The past and the future are separated by the present, which is a mere point of time. The only benefits from wealth, which can be owned at this present point of time, are future benefits. Past benefits have vanished. When a man owns any form of property, he owns a right to future benefits. The idea of "futurity" must therefore be added to our definition; so that it shall read: Property is the right to future benefits of wealth. But even yet we are not quite done with our definition. For the future is always uncertain; no man can ever tell in advance exactly how much future benefit he can obtain; he can only take the chances and risks involved. We must therefore add to our definition the idea of uncertainty. The definition will now read: *Property is the right to the chance of future benefits of wealth.* If a man has the right to *all* the benefits which may come in the future from a particular article of wealth, he is said to have its complete ownership, or its ownership "in fee simple." If he has a right to only *some* of the benefits from a particular article of wealth, he is said to own

that wealth partially, or to "have an interest" in it. When two brothers own a farm in partnership, each is a part owner; each has an interest in the farm; that is, each has a right to half of the benefits to be had from the farm. What is divided between the two brothers is not the farm, but the benefits of the farm. To emphasize this fact the law describes each brother's share as an "*undivided* half interest."

Property may be measured just as wealth and benefits may be measured. For instance, the quantity of property in the form of railroad stock is measured by the number of shares held. After the quantities of property of different kinds are measured, we may apply the same concepts of transfer, exchange, price, and value which have already been applied to wealth and the benefits of wealth. And just as the exchange of wealth was a disguised exchange of the benefits of wealth, so the exchange of services of wealth is a disguised exchange of property rights to these benefits. In the last analysis, then, the only thing that is ever exchanged is property. It is only for the sake of brevity and simplicity that we ever speak in any other terms. It would evidently be pedantic for a man selling wheat to insist always that he was not selling "wheat," but only the "right to possible future benefits from wheat."

§ 3. The Relation between Wealth and Property

We have thus far considered three very important and fundamental concepts: wealth, benefits, and property. A convenient collective term for all of them is "goods."

Wealth and property are only present representatives of future benefits and costs. Wealth being the means, and property the right, to those future benefits (and costs), wealth and property may be said to be coextensive. There cannot be wealth without property, nor property without wealth. This follows from the definitions given. Wealth was defined as something owned; this implies property. Property was

defined as the right to wealth; this implies wealth. In specific cases we can readily see the correspondence. In fact, in cases where wealth is owned "in fee simple" or completely, the correspondence is altogether too clear; so clear that in ordinary parlance the two terms, wealth and property, become confused, as when speaking of a piece of wealth, in the form, say, of land, we call it a "piece of property."

On the other hand, where the ownership is minutely subdivided, the wealth and the property rights to that wealth become so dissociated in our minds that we are apt to fall into the opposite error, and completely lose sight of the connection. For instance, when railway shares are sold in Wall Street, the investor rarely thinks of those shares as connected with any actual wealth. All that he sees are the engraved certificates of his property rights; he has no visual picture of the railway. Sometimes the rights are still further separated from the thing to which the rights relate, — so far that people are unaware that there is anything behind the rights at all, and delude themselves with the notion that there *need* not be anything behind them. A government bond, for instance, is often regarded as a kind of property behind which there is no wealth. But if you examine it, you will find that the wealth of the entire community is behind this property; for it is out of this wealth, by means of taxation, that the bond must be paid. For cities, in fact, there is usually a legal debt limit expressed in terms of the value of taxable wealth to insure the creditors that there shall always be sufficient real wealth behind the city bonds to make their ultimate payment secure.

§ 4. How to find the Wealth underlying Property

While it is sometimes difficult to discover the wealth behind a given property right, the difficulties may easily be removed by following a few simple guides, of which the following are examples: —

(*a*) The first guide is this: Always look for the benefit which the given property confers; and when your eye is fixed on those benefits, *look around for the means by which* those benefits are produced. Benefits do not come of themselves; they always require actual, tangible, concrete, physical means, — either persons or things. The means may not be the same as the cause. For instance, a man living in northern latitudes owns a house that has a southern exposure and therefore a great deal of sunlight. The benefits from that location, therefore, consist partly in abundant sunshine. Now, the land is the means of securing that sunshine, although the sun is the cause. Wealth, though it may not always be the *cause*, is always the *means* of benefits. Take as another example of property, a street railway franchise. If a city sells a franchise permitting a company to build and operate a railway through its streets, — what has the city sold? Is it a right that has no wealth behind it? No; for there are benefits to be gained by the possession of the franchise — the sale of *transportation;* and there are physical means to those benefits — the *streets*. The city streets are therefore the wealth behind the franchise which the city gives or sells. It gives or sells a right to use the streets.

(*b*) A second guide lies in the fact that one property right often overlaps another. For instance, a mill is owned in shares: a railway company owns some of those shares; a bank owns some of the railway shares; and John Smith owns some of the bank shares. It is evident that John Smith has a claim upon the mill, although only distantly, *i.e.* through several intermediate layers of property rights.

Such secondary relations between wealth and property occur when property is held in trust. At common law, the trustee is the legal owner; but the law of equity recognizes the fact that the beneficiary is the true owner. That is, he has a claim against the trustee; it is only for his benefit that the trustee holds the right to the wealth. Through the rights

of the trustee, therefore, the beneficiary has an indirect but secure right to the benefits of the wealth.

(*c*) A third guide is based on the fact that *the correspondence between property and wealth is a contemporaneous correspondence.* That is to say, existing property rights are rights to the use of existing wealth, so that *existing* wealth always underlies *existing* property rights. Next year's fruit crop may be sold in advance. The buyer then has the right to next year's fruit, but this is really a right to, or in, the present fruit trees, expected to bear the fruit. Likewise the right to next year's wheat is a right to, or in, the present farm, farmer, and farm implements. The right to receive a chair or table yet unmade is the right to, or in, the present person, tools, and other wealth of the carpenter, by which that chair or table is to be secured. It would seem at first that " credit " forms an exception, for the right of a creditor is a present right to a future payment. But it is impossible to have a right to any future benefit which is not also a right to some *present* wealth as a means of securing that future benefit. To own a note falling due next year is a part right in the person and other " assets " of the promissor, and ceases to have value as soon as he ceases to be " good for it." It is true that the courts do not restrict a debtor in the disposition of his possessions prior to the maturity of a note. He may elect to squander his resources. Such destruction of the present means of providing for future payment carries with it the impairment or destruction of the value of the note. No future benefits whatever can be owned in the present except as claims on certain requisites of their production that are already in existence. We cannot own next year's goods suspended in mid-air, as it were, any more than we can fly a kite without a cord. There must always be some present means of controlling the future.

And not only is every right to a future benefit a claim on present wealth, but conversely, as already set forth in our definition of wealth, every claim on present wealth is a right

to a future benefit. Owning rights to "futures" is therefore not an exceptional but rather the typical case. As we have seen, all wealth is the existing means toward *future* benefits, and all property consists of present rights to some of those future benefits. It is only through future benefits that wealth and property are bound together at all. The sequence of ideas is: present wealth, future benefits, present rights to future benefits and therefore to the present wealth which is to yield future benefits. Property is thus always a *present* right to the chance of *future* benefits from *present* wealth.

(*d*) Our fourth guide for finding the wealth underlying property is as follows: In cases of the partial ownership of wealth, we should remember that *the aggregate of all partial rights constitutes the total ownership*. Each partial right is a right to a part of the total future benefits. These benefits may be cut up among separate owners in different ways. But the total ownership of the wealth is always the aggregate of the rights to the *entire* stream of future benefits. The character and size of this stream of benefits may of course differ according to the different methods by which ownership is parceled out. But this fact does not invalidate the principle that the total ownership is the combination of all the partial rights.

The future benefits flowing from wealth may be compared to a pennant attached to a flagstaff, — a long streamer stretching out into the future. Some of the possible ways in which the present ownership of these pennants may be subdivided is indicated in Figure 1, which contains three diagrams. The first represents the stream of benefits from a dwelling house. These begin at the present and stretch out indefinitely into the future. If two brothers own the house in partnership, each has a right to half the shelter of the house, *i.e.* to half of its benefits; the benefits are therefore divided, so to speak, *longitudinally* into two parts.

But if the house is rented, the division of benefits between

the tenant and the landlord is *transverse*, as shown in the middle diagram. The tenant has all the benefits of the house for a certain time, after which the landlord has all the future benefits.

The third diagram shows another way in which the benefits may be divided. This is by carving out a particular part of these benefits in the future. It may then be said that the benefits are cut up both longitudinally and transversely. For instance, a patron of the Metropolitan Opera House pays for the use of a "box" for next winter and all the benefits which go with it. He owns certain future benefits from that Opera House. He does not own the whole Opera House, yet he partly owns it, because he owns part of the uses or benefits to be derived from it. The part he owns (the benefits of the box for next winter) may be represented by a small rectangle cut out of the entire stream of benefits from the theater. When a promise is made and a man sells this promise for present money, he has cut out some part of the benefits which in the future will emanate from his person and his other wealth.

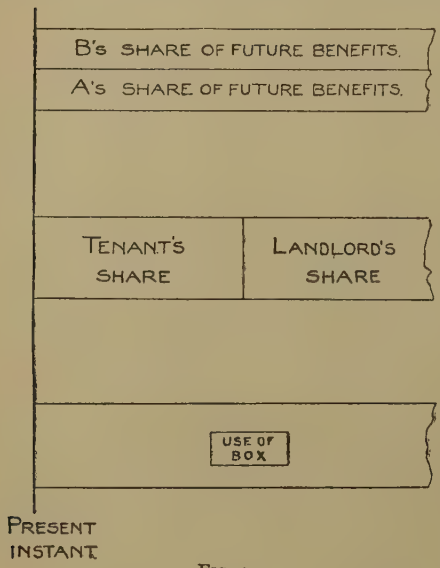


FIG. 1.

It is plain, then, that the succession of benefits emanating from any article of wealth may be cut up longitudinally, or transversely, or by cutting out a certain part.

In common speech, the minor rights to wealth are not ordinarily dignified as rights of ownership. Thus, a tenant's right in the dwelling he occupies is sharply distinguished from the right of the owner. Yet, strictly speaking, every right to use wealth, however insignificant, is a part ownership. When an owner of land wishes to sell an unencumbered title, he finds it necessary to extinguish all outstanding leases, or claims for future benefits, often at considerable cost. It is the total ownership which he professes to sell and the total ownership always includes the ownership which the tenant enjoys.

Applying the above rules there can be no difficulty in discovering for each property right some underlying wealth in conformity with the general principle that wealth and property are coextensive.

§ 5. Practical Problems of Property

Since wealth and property are inseparable, economics might be called the science of property as well as the science of wealth. When we treat of the welfare of a community, we think rather of wealth than of property. When we treat of the welfare of an individual, we think rather of property than of wealth. The fact that wealth and property are coextensive should be emphasized because it will save us from confusions which are all too common, and it will save us also from many practical blunders growing out of these confusions. If our State legislatures understood this principle, there would be less of the iniquitous double taxation that is the bane of present systems of State and local taxation. Such unjust taxation is illustrated by the case of the Massachusetts factory owner who decided to transfer his property to a stock company of which he himself should hold all the stock. Previously he paid taxes only on the factory itself; but when the " company " was formed, the tax collector came along and informed him that henceforth not only

must the "company" pay taxes on the factory, but that he personally must pay taxes on the stock also, since stock is taxable "personal property." Thus the owner was taxed both on the stock which represented the factory and on the factory itself. Such instances of double taxation are quite common in the United States though they are not all so self-evident as this.

Many of the most important problems of economic policy are problems of the form of ownership of wealth. The great slavery question turned upon the problem whether one man should be owned by another, or whether he should own himself. It was partly a question whether one man could steal another man away from Africa, and partly a question whether any man could sell himself. Those questions have been settled in the negative, and it is now regarded as bad public policy for one man to own another in fee simple. Yet we do own *partial rights* in others. In fact it is very difficult to find a man so free that some one has not a claim upon him. These partial rights are, of course, very different in their practical effects from perpetual ownership.

Another property problem, and one somewhat similar, is that of perpetual franchises. Is it good public policy to grant to a street railway company in perpetuity the rights to use a city's streets? Or ought we to fix a time limit, say fifty years, after which the rights revert to the city? A kindred question has been raised by Henry George and others as to private property in land. Is it wise public policy that the present form of land ownership in fee simple should continue? Ought a man to have the right to a piece of land forever, — perhaps abusing that right, obstructing others, and neglecting the opportunities which it affords? Should the government step in and lease the land for limited periods? This question is now being discussed with reference to our mineral lands and particularly our coal lands in Alaska. Questions of land ownership have in all ages vexed men's minds and been the source of social unrest.

Rome had her agrarian troubles; not unlike those of modern England and Ireland.

The right to bequeath property is also a prime source of trouble. The right to dispose of property by will has not always been recognized. It was developed by the Romans, from whose system of law we borrowed it. Even now it is a limited right, and its exercise differs with law and custom. These differences are responsible, for instance, for peasant proprietorship in France and primogeniture in England. The right has, indeed, been limited so as to prevent the perpetual tying up of an estate by a testator. Its further limitation will probably be one of the problems of the future.

An even broader question of the same sort is the question of socialism. Shall we continue what is called private property, except in the things that we wear and eat, and possibly the houses in which we live? That is, shall we allow our railways and our factories to be owned by private individuals? Or shall they be owned by the community at large so that we may all have shares in them, as we already have in the post office and the government printing office? These are some of the greatest problems in economics; and they are problems concerning the ownership of wealth.

§ 6. Table of Typical Property Rights

The following table indicates the most important types of property, and shows in each case the wealth on which the property right is based and the benefits accruing from that wealth. The most important forms are: fee simple, stocks, bonds, notes, leases, partnership rights, and contracts.

TYPICAL CASES ILLUSTRATING THE EXISTENCE OF WEALTH BEHIND PROPERTY RIGHTS

Name of Case	Wealth on which the Property Right is Based	Benefits of that Wealth	Description of Property Right	Certificate of Ownership if Any
Fee Simple	Farm	Yielding crops	Right to all use of farm forever	Deed
Partnership	Dry Goods	Yielding profits from sale	One partner's "undivided" one-third interest	Articles of agreement
Joint Stock	Railway	Yielding profits	The shares of stock	Stock certificate
Street Franchise	Street	Use of same for passage, etc.	Right to run cars through it Right to run wires through it	Charter
Lease or Hire	Dwelling	Use of same for for shelter, etc.	Right of tenant till fixed date Right of landlord thereafter	Lease
Railway Ticket	Railway	Transportation	Right to specified trip	Ticket
Railway Bond	Railway	Payment of "interest" and "principal"	Right to same and contingent right to foreclose	Bond certificate
Personal Note	All the possessions of the signer	Payments	Right to same and in default thereof, right to collateral security	Note
Monopoly Franchise	General wealth of community (persons included)	Refraining from doing similar business	Right to compel same	Charter
Government Property	Streets, public parks and buildings	Uses of same	Right to walk over and otherwise use same	Official recorded plats, old grants, individual dedications deeds

CHAPTER III

CAPITAL

§ 1. Capital and Income

In the foregoing chapters we have set forth several fundamental concepts of economic science, — wealth, property, benefits, price, and value. We have seen that wealth consists of material appropriated objects, and that property consists of rights in these objects; that wealth in its broadest sense includes human beings, and property in its broadest sense includes all rights whatsoever; that benefits are the desirable occurrences which happen through wealth; that prices are the ratios of exchange between quantities of wealth, property, or benefits; and that value is price multiplied by quantity. These concepts are the chief tools needed in economic study.

Little has yet been said about the relation of these various magnitudes to *time* — that great "independent variable" of human experience. When we speak of a certain quantity of wealth, we may refer either (1) to a quantity existing at a particular *instant* of time, or (2) to a quantity produced, consumed, exchanged, or transported during a particular *period* of time. The first is a *stock* of wealth; the second is a *flow* of wealth. A stock is fully specified by one magnitude only, namely, its amount. But a flow requires two, — the *amount* of what flows and the *duration* of its flow. From these two we derive a third, namely, the *rate* of flow, or the quotient of the number representing the amount divided by the number representing the duration. The rate of flow is often more important than the amount of flow. We care less to know

the aggregate wages of a workman during his lifetime than his rate of wages during various periods of his life. The most important purpose of this distinction between a stock and a flow is to differentiate between capital and income. Capital is a stock, and income a flow. This, however, is not the only difference between capital and income. There is another, equally important; namely, that capital is *wealth*, and income is the *benefit* of wealth. We have, therefore, the following definitions: A *stock of wealth* existing at a given *instant* of time is called *capital*.[1] A *flow of benefits* through a period of time is called *income*. A dwelling house now existing is capital; the shelter or the rent it affords is its income. The railways of the country are capital; their benefits (in the form of transportation) are the income they yield.

§ 2. Senses of the Term "Capital"

We have defined capital as a quantity of wealth existing at a given point of time. An instantaneous photograph of wealth would reveal, not only a stock of durable wealth, but also a stock of wealth of rapid consumption. It would disclose, not the annual procession of such goods, but the members of that procession that had not yet been transmuted in form or had not yet passed off the stage of existence, however swiftly they might be moving across it. It would show trainloads of meat, eggs, and milk in transit, cargoes of fish, spices, and sugar, as well as the contents of private pantries, ice chests, and wine cellars. Even the supplies on the table of a man bolting his dinner would find a place. So the clothes in one's wardrobe or on one's back, the tobacco in a smoker's pouch or pipe, the oil in the can or lamp, would all be elements in this flashlight picture.

[1] Many authors restrict the name *capital* to a particular kind or species of wealth, or to wealth used for a particular purpose, such as the production of new wealth; in short, to some specific part of wealth instead of any or all of it. Such a limitation, however, is not only difficult to make, but cripples the usefulness of the concept in economic analysis.

Not only is a stock of wealth called capital, but a stock of property is also called capital. The two may be distinguished as *capital-wealth* and *capital-property*. Again, the *value* of either is called capital; and this third kind of capital may be distinguished as *capital-value*.

A capital account is a statement of the amount and value of the property of a specific owner at any instant of time. It consists of two columns, — the assets and the liabilities, — the positive and negative items of capital. The liabilities of an owner are his debts and obligations to others; that is, they are the property rights of others for which this owner is responsible. The assets or resources of the owner are all his property rights, irrespective of his liabilities. The assets include both the property which makes good the liabilities, and the property, if any, in excess of the liabilities. They also include, if exhaustively considered, the person of the owner himself, if that owner is a real person and not an artificial person, such as a corporation.

The owner may be either such a physical human being, or it may be an abstract entity in which a collection of human beings is interested, such as an association, a joint stock company, a corporation, or a government. With respect to a debt or liability, the person who owes it is the debtor, and the person owed is the creditor. The difference in value between the total assets and the total liabilities of either individual is the *net capital*, or *capital-balance* indicated in the account of such individual.

The items in a capital account are constantly changing, and their values also; so that when, after one statement of assets and liabilities is drawn up, and another is constructed, say a year later, the balancing item, or net capital, may have changed considerably. However, bookkeepers are accustomed to keep the " capital " item intact from the beginning of their account, and to characterize any increase of it as " surplus " or " undivided profits." There are several reasons for this bookkeeping policy. In the first place,

the less often the bookkeeper's entries are altered, the simpler the bookkeeping. Again, by stating separately the original capital and its later increase, the books show at a glance what the history of the company has been as to the accumulations of capital. Finally, in the case of joint stock companies, the capital is represented by stock certificates, the engraved " face value " of which cannot conveniently be altered to keep pace with changes in real value. Consequently, it is customary for bookkeepers to maintain the book value if the " capital " is equal to the face value of the certificates. But this bookkeeping policy does not alter the fact that at a given instant the owner's capital consists of the entire excess of his assets over his liabilities, including the accumulated surplus and undivided profits.

The following two balance sheets show the accumulation of that part of capital which bookkeepers separate from the capital account and call " surplus."

JANUARY 1, 1910

Assets		Liabilities	
Plant	$200,000	Debts	$100,000
		Capital (owed to the stockholders) . . .	100,000
	$200,000		$200,000

JANUARY 1, 1911

Plant, etc.	$246,324	Debts	$100,000
		Capital	100,000
		Surplus	46,324
	$246,324		$246,324

But not only is the book item, " capital," maintained intact as long as possible, but often the surplus also is put in round numbers and kept at the same figure for several successive reports. That is, the *smaller* fluctuations are

registered in a third item, called " undivided profits." The distinction between surplus and undivided profits is thus merely one of degree. The three items — capital, surplus, and undivided profits — together make up the total present net capital. Of this, " capital " represents the original capital, " surplus " the earlier and larger accumulations, and " undivided profits " the later and minor accumulations. The undivided profits are more likely soon to disappear in dividends, that is, to become *divided* profits, although this may also happen to the surplus, or even in certain cases to the capital itself.

We see, then, that the capital of a company, firm, or person, is to be understood in two senses : first, as the item entered by the bookkeeper under that head, — the *original* capital; and secondly, this sum plus surplus and undivided profits, — the true net capital at the instant under consideration.

Inasmuch as the stock certificates were issued at the formation of the company, and cannot be perpetually changed, they ordinarily correspond to the original capital instead of the present capital. Recapitalization may be effected, however, by recalling the stock certificates and issuing new ones. In this way the nominal or book value may be either decreased or increased. It is sometimes scaled down because of shrinking assets, and sometimes increased because of new subscriptions or expanding assets. If, for instance, the original capital was $100,000, and the present capital (including the surplus and undivided profits) is $200,000, it would be possible, in order that the total certificates outstanding might become $200,000, and the surplus and undivided profits be enrolled as capital, to issue stock certificates free to each stockholder. Such an issue of stock is called a stock dividend. Ordinarily, however, the stock certificates remain as originally, and merely increase in value. Thus, if the present capital is $200,000, whereas the original capital and the outstanding certificates amount to only $100,000, the " market value " of the shares will be

double the face value; for the stockholders own a total of $200,000, represented by certificates whose " face value " is $100,000.

§ 3. Book and Market Values

If, however, we attempt to verify such a relation by reference to the company's books, we shall find some discrepancies in the results. For instance, a national bank of New York reported a total capital, surplus, and undivided profits of $1,295,952.59, of which the original capital was only $300,000. We should expect, therefore, that the stock certificates, amounting to $300,000, would be worth $1,295,952.59, or, in other words, that each $100 of stock certificates would be worth $432. The actual selling price, however, was about $700. The discrepancy between $432 and $700 is due to the fact that there are two estimates of the capitalized value of earning power, — one that of the bookkeeper, which is seldom revised and usually conservative, and the other that of the market, which is revised almost daily. The stockholders of this bank were credited by the bookkeeper with owning $1,295,952.59, whereas, in reality, the total value of their property was more nearly $2,100,000. The bookkeeper systematically undervalued the assets of the bank, and even omitted some valuable assets altogether, such as " good will." The object of a conservative business man in keeping his books is not to obtain mathematical accuracy, but to make so conservative a valuation as to be well within the market.

Of the two valuations of the capital of a company, the bookkeeper's and the market's, the latter is apt to be the truer of the two, although it must be remembered that each of them is merely an appraisement. The ordinary bookkeeper's figures, which have so imposing an appearance of accuracy, are in reality, and often of necessity, very wide of the mark.

§ 4. Case of Decreasing Capital-balance

We have seen that the effect upon the balance sheet of an increase in the value of the assets is to swell the surplus or the undivided profits. Conversely, a shrinkage of value tends to diminish those items. For instance, if the plant of a company having a capital of $100,000 and a surplus of $50,000 depreciates to the extent of $40,000, the effect on the books will be as follows: —

ORIGINAL BALANCE SHEET

Assets		Liabilities	
Plant	$200,000.00	Debts	$150,000.00
Miscellaneous	101,256.42	Capital	100,000.00
		Surplus	50,000.00
		Undivided profits	1,256.42
	$301,256.42		$301,256.42

PRESENT BALANCE SHEET

Assets		Liabilities	
Plant	$160,000.00	Debts	$150,000.00
Miscellaneous	101,256.42	Capital	100,000.00
		Surplus	10,000.00
		Undivided profits	1,256.42
	$261,256.42		$261,256.42

Here the shrinkage in the value of the plant, as recorded on the assets side, " comes out of the surplus," as recorded on the liabilities side.

In case the surplus and undivided profits have both been wiped out, the capital itself becomes impaired. In this case the bookkeeper may indicate the result by scaling down the capitalization. This sometimes occurs in banks and trust companies, but not often in ordinary business. It is often avoided by making up the deficiencies through assessment of stockholders or postponement of dividends. Such meas-

ures are required by law in many cases, as in that of insurance companies. Dishonest concerns, however, often conceal their true condition by the reverse process of exaggerating the value of the assets. Sometimes this is done systematically, as in the case of stock-jobbing concerns. The sums intrusted to unscrupulous promoters by confiding stockholders are often invested in unwise or fraudulent ways. For instance, take an Oil Well Company in California, of the illegitimate type called "stock-producing wells." Suppose it borrows $50,000 and collects $50,000 more from the sale of stock (at par), and with this $100,000 purchases land of friends at a fancy price, collusively providing that the proceeds be returned in large part to the promoter. In such a case the books of the bubble concern will show the following figures: —

Assets		Liabilities	
Land	$100,000	Debts	$50,000
		Capital	50,000
	$100,000		$100,000

But if the land is worth, say only $60,000, these accounts *should* read :—

Assets		Liabilities	
Land	$60,000	Debts	$50,000
		Capital	10,000
	$60,000		$60,000

In other words, the investor has only $10,000 worth of property, instead of the $50,000 which he put in, or 20 cents for every dollar invested. The rest has been diverted into the pockets of the promoter and of those in collusion with the promoter.

This is an example of what, in commercial slang, is called "stock watering," which may be defined as the issue of stock without a corresponding increase in actual capital

value. It is sometimes said that there is no wrong in stock watering, so long as it is fully known. This is much like saying that to lie is not wrong provided everybody knows you are lying. Stock watering usually represents an intention to deceive, and through this deceit injury may be done both to buyers of stock and buyers of bonds. The buyers of stock are injured if they buy without knowledge of the proposed stock watering, and the bond buyer is injured if the watering of the stock, having given him a false idea of the actual capital, induces him to lend more money than the capital can satisfactorily secure.

§ 5. Insolvency

The original capital of a concern may be either increased or decreased. In the course of its fluctuations it may sometimes shrink to zero. If it shrinks below zero, we have "insolvency," — the condition in which assets fall short of liabilities. The capital-balance is intended to prevent this very calamity; it is for the express purpose of guaranteeing the value of the *other* liabilities, — those to bondholders and other creditors.

These other liabilities, for the most part, are fixed blocks of property, carved, as it were, out of the assets, and which the merchant or company has agreed to keep intact at all hazards. The fortunes of business will naturally cause the whole volume of assets to vary in value, but all this "slack" ought properly to be taken up or given out by the capital, surplus, and undivided profits. A man's capital thus acts as a buffer to keep the liabilities from overtaking the assets. It is the "margin" he puts up as a guarantee to others who intrust their capital to him.

The amount of capital-balance necessary to make a business reasonably safe will differ with circumstances. A capital-balance equal to 5 per cent of the liabilities may, in one kind of business, such as the business of a mortgage

company, be perfectly adequate, whereas 50 per cent may be required in another kind. Much depends on how likely the assets are to shrink and to what extent; and much, likewise, depends on the character of the liabilities.

The risk of insolvency is the chance that the assets may shrink below the liabilities. This risk is the greater, the more shrinkable the assets, and the less the margin of capital value between assets and liabilities.

Insolvency must be distinguished from insufficiency of cash. The assets may comfortably exceed the liabilities, and yet the cash assets at a particular moment may be less than the cash liabilities due at that moment. This condition is not true insolvency, but only insufficiency of cash. In such a case, a little forbearance on the part of creditors may be all that is necessary to prevent financial shipwreck.

A wise merchant, however, will not only avoid insolvency, but also insufficiency of cash. He will not only keep his assets in excess of his liabilities by a safe margin, but he will also see that his assets are invested in such a manner that he shall be able to cancel each claim at the time and in the manner agreed upon.

From this point of view there are three chief forms of assets, — already touched upon in Chapter I, — cash assets, quick assets, and slow assets. A cash asset is property in actual money, or what is acceptable in place of money. A quick asset is one which may be exchanged for cash in a relatively short time, as, for instance, call loans, short-time loans, and other marketable securities. A slow asset is one which may require a relatively long time to be exchanged for cash. Such are real estate, office fixtures, and manufacturers' equipment.

If all property were as acceptable as money, there would be no need of classifying assets into these three groups. But since the creditor will not accept railway stock or bonds, when he has contracted for payment in money, the debtor must maneuver so as to keep on hand a sufficient quantity of quick assets and of cash assets to enable him to meet his

obligations when they are due. A large part of the skill of a business man consists in marshaling his assets so that he always has enough cash, and quick assets to provide for impending debts, while maintaining at the same time enough slow assets to insure a satisfactory income from his business.

Originally, before business was separated from private life, all of a debtor's assets, even including his own person, were regarded as pledged to the payment of a debt. An insolvent debtor could be imprisoned. To-day, however, laws exist in most countries by which a bankrupt may be discharged, free from further liability.

Since the liabilities of one man are also the assets of another, when one man fails and is able to pay only fifty cents on the dollar, the unlucky man who is his creditor, — who has his notes as assets, suffers a shrinkage in his own assets which may in turn mean embarrassment or even bankruptcy to him. It is usually true in a panic that the failures start with the collapse of some big firm, involving a shrinkage in the assets of others. This indicates why assets ought usually to be undervalued. A man who is in debt has no right to exaggerate his means of payment. A conservative and honest business man will therefore always undervalue rather than overvalue his assets, in order to be fair to his creditors.

§ 6. Two Methods of combining Capital Accounts

We have seen how the capital account of each person in a community is formed. We are, however, more interested in the bookkeeping of society at large than in the bookkeeping of the individuals composing it. Our next task, therefore, is to express the total capital of any community. This is the sum of the capital of its members, that is, all the assets less all the liabilities. There are two chief ways of combining these plus and minus items in order to obtain the total for society at large.

The simplest is to obtain first the net capital balance of each person by subtracting the value of his liabilities from that of his assets, and then to add these net capitals together, as the capital of society. This is the method of *balances*. We balance the books of each individual. But we may add and subtract the items of assets and liabilities in many other ways. One way which takes account of the network of debts and credits between individuals is to couple each liability with its equal and opposite asset, existing in another individual's account and cancel these two against each other. This is called the method of *couples*. We couple items in different accounts. This method of couples is based on the fact that every liability item in a balance sheet implies the existence of an equal asset in some other balance sheet. This is true because every debit implies a credit. It follows that every negative term in one balance sheet may be canceled against a corresponding positive term in some other. Each of these two methods — of balances and of couples — is important in its own way.

Let us illustrate each by the balance sheets of three persons, say X, Y, and Z:

PERSON X

Assets		Liabilities	
Z's note	$30,000 *A*	Mortgage held by Y	$50,000 *b*
Residence	70,000	(Capital balance .	70,000)
Railroad shares . .	20,000		
	$120,000		$120,000

PERSON Y

Assets		Liabilities	
X's mortgage . . .	$50,000 *B*	Debt to Z	$40,000 *c*
Personal effects . .	20,000	(Capital balance . .	40,000)
Railroad shares . .	10,000		
	$80,000		$80,000

PERSON Z

ASSETS		LIABILITIES	
Y's debt . . .	$40,000 *C*	Debt to X . . .	$30,000 *a*
Farm	50,000	(Capital balance . .	80,000)
Railroad bonds .	20,000		
	$110,000		$110,000

Each couple of corresponding items — *i.e.* each item which appears twice, once as a liability of one man and again as an asset of another — is indicated in both places by the same letter. Thus, "*A*" in "X's" assets is matched by the equal and opposite item "*a*" in Z's liabilities. The method of couples thus consists in omitting from society's balance sheet these pairs of items, and entering only those which remain uncanceled. These, in the present case, are all assets.

The results of summing up the capital accounts by the two methods are shown in the following tables: —

METHOD OF BALANCES		METHOD OF COUPLES	
X's capital	$70,000	Residence	$70,000
Y's capital	40,000	Personal effects . . .	20,000
Z's capital	80,000	Farm	50,000
		Railroad shares . . .	30,000
		Railroad bonds . . .	20,000
	$190,000		$190,000

The totals are the same by both methods, but the method of balances shows the share of this total capital which is owned by each individual, while the method of couples shows portions ascribable to each different capital-good.

§ 7. Real and Fictitious Persons

It is well to note here the distinction between the accounting of *real* persons and of *fictitious* persons (such as corporations). For a real person, the assets may be, and usually

are, in excess of the liabilities, and the difference is the capital-balance of that person. This capital is not to be regarded as a liability, but as a balance or difference between the liabilities and the assets. For a fictitious person, on the other hand (a corporation or partnership), the liabilities are always *exactly equal* to the assets; for the balancing item called *capital* is as truly an obligation (from the fictitious person to the real stockholders) as any of the other liabilities. A fictitious person, in fact, is a mere bookkeeping dummy, holding certain assets and owing *all* of them out again to real persons, including the stockholders. Bookkeepers, it is true, apply the same methods in both cases, but they do so by regarding the account even of a real person as relating to a fictitious entity for bookkeeping purposes. For bookkeeping purposes, one's business self and one's real self are separated. Thus, if X's business shows a balance in X's favor of $10,000, he enters this as a liability item in his business accounts and considers his " business " as owing him this sum. There is no objection to such a procedure. But we must remember that when we say that X's " business " owes X $10,000, we imply that the real X in his *own* accounts holds a claim of that amount against his " business." In other words, we are compelled, in order to be consistent, to open a separate account for X as an individual, and carry forward the $10,000 balance from the debit side of his business accounts to the credit side of his personal accounts, thus: —

X's Business

Assets		Liabilities	
Miscellaneous . . .	$50,000	Due to others . . .	$40,000
		Due to X	10,000
	$50,000		$50,000

X's Self

Assets	
Due from " X's business "	$10,000

But in the second account there is no counterbalancing liability. For real persons, then, in the last analysis, — that is, as represented by "X's self," — the value of assets and that of liabilities are not equal. If they were, the addition of their balance sheets would yield zero for society.

§ 8. Ultimate Result of Method of Couples

With this preliminary explanation, let us now introduce into our addition the capital accounts of the railroad whose stocks and bonds are included among the assets of persons X, Y, and Z. For simplicity, we shall suppose that these three persons are the only persons interested in the road. The balance sheet of the railroad company will accordingly appear as follows: —

RAILROAD COMPANY

ASSETS		LIABILITIES	
Railway	$50,000	Bonds (held by Z) . .	$20,000
		Capital stock	
		(held by X) $20,000	
		(held by Y) $10,000	30,000
	$50,000		$50,000

Now if we combine this balance sheet with the preceding, we shall see that its inclusion does not affect the results which were obtained by the method of balances before the railroad was introduced into the discussion. The totals will stand as follows: —

X's capital balance	$70,000
Y's capital balance	40,000
Z's capital balance	80,000
Railroad Co.'s capital balance	00,000
	$190,000

When we apply the method of couples, however, we find that the inclusion of the railway company's capital account

will affect the items in the final sum. The stocks and bonds, as assets of X, Y, and Z, will now pair off with the corresponding liabilities of the railroad company, and their place will be taken by the concrete railroad itself, as follows: —

METHOD OF COUPLES

Residence	$70,000
Personal effects	20,000
Farm	50,000
Railway	50,000
	$190,000

The appearance of the capital inventory is thus changed. Formerly, the items of property rights in it included such *part*-rights as stocks and bonds; now they consist only of *complete* property rights. But the complete right to any article of wealth is best expressed in terms of the article of wealth itself. Consequently, instead of the long phrase, the "right to a residence," we merely use "residence." The property no longer veils the wealth beneath it, and the inventory, which before was called an inventory of *property*-capital, is now *also* an inventory of *wealth*-capital.

Such a result is sure to follow when we combine capital accounts, provided we combine enough of them to supply, for every liability item, its counterpart asset, and for every asset *which has one*, its counterpart liability. These assets which have no counterparts are what we have called *complete* rights to wealth, or "fees simple"; those assets which do have counterparts are the *partial* rights to wealth. The reason is that every article of concrete wealth is to be regarded as owned in "fee simple" by *some one*, even if we have to set up a fictitious person or dummy for that very purpose. Hence, every part-right to such an article of concrete wealth will necessarily appear as a liability on the opposite side of the fictitious person's account. Thus, if two brothers own a farm in equal shares, the shares will appear as assets in the brothers' individual accounts; but

since the farm *as a whole* is regarded as owned by the partnership person called "Smith Brothers," the balance sheet of this fictitious person will show as assets the farm itself, and as liabilities the "undivided half interest" of each brother.

To follow out totals of capital thus requires the inclusion of many fictitious persons, for it is often only the fictitious persons who hold the complete rights. Locomotives and railway stations, for instance, are owned by corporations, not individuals. In fact, these fictitious persons — partnerships, corporations, trusts, municipalities, associations, and the like — are formed for the express purpose of holding large aggregations of concrete wealth and parceling out its ownership among a number of real persons.

If, then, we suppose balance sheets so constructed as to include all the real and fictitious persons in the world, with entries in them for every asset and liability, — even public parks and streets, household furniture, persons themselves, and other possessions not ordinarily formally accounted for in practice, — it is evident that we shall obtain, by the method of balances, a complete account of the distribution of capital-value among real persons; and, by the method of couples, a complete list of the articles of actual wealth thus owned. In this list there will be no stocks, bonds, mortgages, notes, or other part-rights, but only land, buildings, and other land improvements, commodities, and real persons. In other words, we arrive again at the proposition of Chapter II, that wealth underlies and corresponds to property.

§ 9. Confusions to be Avoided

Among part-right in real wealth is "credit." There has been much discussion as to the nature of credit; whether, in particular, credit is to be regarded as capital. It has been claimed that from the merchant's point of view credit is capital because it enables a business man to enlarge his busi-

ness. But this view entails double counting. We have seen from our study of capital accounts how to avoid such double counting. That part of a man's so-called capital which is borrowed cannot enter his books as *his* capital at all, being but a manifestation of the fact that the total capital of the community is owned in part by *others*. Indeed, the phenomenon of credit means nothing more or less than a specific form of divided ownership of wealth. Credit merely enables one man temporarily to control more wealth or property than he owns — that is, some part of the wealth or property of others.

It is therefore a cardinal error to regard credit as increasing of the capital of the debtor. Indirectly, credit may *result* in an increase of society's capital, by stimulating trade and production, as well as by getting the management of capital into the right hands and its ownership into the most effective form. In these ways the earth is made to yield up more wealth or greater benefits from the same wealth, — in either case entailing an increase of "capital," — *i.e.* "capital-wealth" or "capital-value"; but the amount of any such increase of capital thus indirectly produced bears no necessary relation to the amount of the credit which facilitated its production. If capital is increased, the credit does not *constitute* the increase, but merely represents a part ownership in the final total, after all the increments have been included.

A great deal of confusion in legislation and discussion could be avoided if the two methods of combining capital accounts were distinguished and their interrelations recognized. In taxation, the two methods are often confused. A chief problem of efficient taxation is how to tax all property once, and none of it more than once. There are two solutions: One is to tax the amount owned by each real person in a list which expresses the method of balances; this method seeks out the real *owners* or part-owners of wealth. The other is to tax the actual concrete wealth in a list which expresses the method of couples; this method seeks out the real *wealth*

owned. At present the two are much confused. Legislators too often fail to perceive that under the first, or owner-method, corporations should not be taxed, for they are not true owners; and that under the second, or wealth-method, bonds, stocks, and other part-rights to wealth should not be taxed, for these are sufficiently included when the actual railways and other items of physical wealth underlying such part-rights are taxed. It is not claimed, of course, that a complete system of taxation can be worked out merely by choosing one of the two methods just indicated. But the distinction between the two should be observed, for where one system is applied the other cannot also be applied without double taxation.

CHAPTER IV

INCOME

§1. Concepts of Income and Outgo

THE income from any particular instrument has been defined as the flow of *benefits* from that instrument. These benefits may sometimes consist of money payments; but it is important to avoid the mistaken notion that they consist always of money payments. Income is the flow of *whatever* benefits accrue from any instrument, whether these benefits happen to be in the form of money or not. A self-supporting farmer, for instance, may not receive or expend a single dollar from one year's end to the other, yet he has an income. He gets a living — the most important kind of income — from the farm. A windmill pumps water; the pumping is the benefit or income resulting from the windmill. A derrick hoists coal from a mine; the hoisting is its income. Human beings do work; their work is an item of society's income, as are all the operations of industry and all the transactions of commerce. When axes fell trees and sawmills turn them into lumber, these changes constitute the income flowing from the agencies which produce them. When a manufacturing plant converts raw materials into food or into fabrics or into implements, these changes constitute the gross income produced by the plant. The warmth and shelter that a house provides for its occupants go to make up the income furnished by the house. What we call agriculture, mining, commerce, and domestic operations are large and important classes of income, yielded by similar agencies.

Income, being a flow of benefits, implies a stock or fund of instruments which produces the flow. This stock of instruments is what we have already designated as "capital."

It has already been noted that income differs from capital in two respects. In the first place, it is a flow relating to a stated period, whereas capital is a fund relating to a given instant. In the second place, it consists of (intangible) benefits, whereas capital consists of (tangible) instruments; not farms, therefore, nor houses, nor food, nor railroads, nor artesian wells, nor goods of any sort can ever constitute income. Income consists rather in the yielding of crops by the farm; the warming and sheltering of people by the houses; the nourishing of people by the food; the transporting of passengers and freight by the railroads; the raising of water by the wells; and benefits of any sort by goods of any sort.

Although income consists partly of other benefits than money receipts, all income, like all capital, may be translated into terms of money. And to income as to capital may be applied the concepts of price and value.

So much for gross income, the positive side of the income account. But just as in our capital account we found a negative side — comprising the liabilities, — so we shall find a negative side to income. The negative of income is called outgo, and the items which constitute outgo are called costs. A cost of an instrument has been already defined as the opposite of a benefit of an instrument. It is an undesirable event occasioned by the instrument. Labor, trouble, expense, and sacrifice of all sorts are entailed by wealth and are counted among its costs. An instrument seldom confers benefits without also involving costs. A dwelling, while it gives shelter, compels its owner to assume important costs in keeping it in repair, painting it, cleaning it, caring for it, insuring it, and paying taxes upon it. A saddle horse yields income to the owner when it gives him a pleasure ride, but it requires feeding

and stabling and shoeing, — the negative side of the account, constituting the outgo or flow of costs occasioned by the horse. A farm produces benefits in yielding crops; but it requires fertilizing, seed planting, and tilling, all of which are costs occasioned by the farm. A railroad produces benefits called transportation — hauling passengers and commodities; but it requires an expenditure of money, it burns coal, it demands labor; and these are the outgo, or the negative side of its account.

Costs, too, may be measured in money just as income may be measured in money; and some costs consist in the actual *expenditure* of money, just as some benefits consist in the *receipt* of money. Neither consists of actual money. We must therefore distinguish carefully three money items: *money on hand* at an instant of time, which is an example of capital; *money received* during a period of time, which is an example of income (from whatever instrument is the means of bringing the money in); and money expended during a period of time, which is an example of outgo (on the part of whatever instrument occasioned the expense.)

In general, the costs of a given item of capital are outweighed by its benefits. For if it should yield more costs than benefits, it would be thrown away, thereupon ceasing to be wealth according to definition. Or if it should still remain in any one's possession, it might be called negative wealth, of which ashes, rubbish, garbage, etc., are familiar examples.

Costs are never voluntarily assumed except in the hope of benefits which will make them worth while. The total *gross* income, *i.e.* the value of the benefits of wealth minus the total outgo, *i.e.* the value of its costs, constitute *net* income. Thus, just as net capital is found by subtracting the liabilities from the assets in a capital account, so net income in an income account is found by subtracting the value of the costs from the value of the benefits. Both benefits and costs, however, are attributable to a definite

capital source. In income-accounting the benefits or income-items are credited to capital, and the outgo or cost-items are debited to capital. In keeping income accounts, therefore, it is important to know to what category of capital any item of income should be credited, or any item of outgo debited.

§ 2. Income Accounts

We are now in a position to apply the foregoing definitions to income accounts. We begin by imagining a certain "house and lot" as one composite instrument, and shall first consider its income and outgo during the calendar year 1910. The instrument is capital, and the income which this capital brings to its owner may be either a money rental or the direct shelter and similar benefits of the house enjoyed by himself and his family. In either case the income may be measured in money, although in the case of occupancy by the owner this measurement requires a special appraisement. The house, let us suppose, was built many years ago, and is now nearly worn out. It yields an income worth $1000 a year. Against its income there are offsets in the form of repairs, taxes, etc., — costs which it occasions. We have, then, the following "income account": —

INCOME ACCOUNT FOR HOUSE AND LOT DURING THE YEAR 1910

INCOME		OUTGO	
Use of house and lot	$1000	Repairs	$200
		Taxes	100
		Insurance	100
	$1000		$400

The net income is therefore $ 600.

Next year the house is found to have rotten beams, is condemned, and must be abandoned or torn down. Its benefits are ended, but the land is still good, and the owner can build a new house. The period consumed by this opera-

tion is the first six months of the year 1911, so that during such period there is no income attributable to the house and lot, but only outgo. During the second half of the year the house is occupied and its use is valued at $600. In the first six months not only did the " house and lot " fail to yield any income, but it occasioned a cost. This cost was the *cost of production* of the house.

We have, then, the following account: —

INCCOME ACCOUNT FOR HOUSE AND LOT DURING YEAR 1911

INCOME		OUTGO	
Use of house and lot (six months)	$600	Expense of building house	$10,000
		Taxes	100
	$600		$10,100
		Net outgo	$9,500

During this year, then, the house causes a net outgo of $9500. All costs are " necessary evils "; they lead to good, though not good themselves; and this cost of constructing the house was incurred only for the sake of resulting future benefits. The adverse balance it creates is only temporary and will be more than made up in the years which follow.

For the year 1912 we have the following: —

INCOME ACCOUNT FOR HOUSE AND LOT DURING YEAR 1912

INCOME		OUTGO	
Use	$1200	Repairs	$ 50
		Taxes	150
	$1200		$200
Net income	$1000		

These figures remain about the same for *forty-nine* years, and give $49,000 net income during that time, canceling the excess in cost for 1911 ($9500) and leaving a large margin besides. Then the house is worn out a second time and has to be rebuilt. The same cycle is repeated, one year

of excess of cost being offset by forty-nine years of excess of income.

It will be observed that the cost of reconstructing the house was entered in the accounts in exactly the same way as repairs or other " current " costs. This procedure may seem objectionable on the ground that reconstruction is not a part of " running expenses " but of " capital cost," and should therefore belong not to the income account but to the capital account. It is true that the *value of the new house* must be entered on the capital-balance sheet, but the *cost of producing it* belongs properly to the income account. The former relates to an instant of time (which may be any instant from the time the house is begun till the time when it ceases to exist); the latter relates to a *period* of time (which may be all or any part of the time during which the labor and other sacrifices occasioned by the house occur). A house is quite distinct from the series of sacrifices by which it was built, although the confusion between the two is natural in view of the bookkeeping practice of entering capital at its " cost value." The house on which $10,000 was expended for construction may be worth either more or less than $10,000. In either case the income account should contain $10,000 on the outgo side, and the capital account a larger or smaller figure, as the case may require.

Yet we instinctively object to entering the cost of building the house in its income-and-outgo account; and we express this objection by calling this cost a " capital cost," rather than a part of running expenses. By so classing it we mean that it does not recur, or, at any rate, recurs only at long intervals. On this basis many persons hold that income and outgo should be confined to " regular " items; and this mistaken view seems plausible because in actual practice an extraordinary expense in a given year, like the cost of constructing a house, does not usually reduce the owner's net income for that year by that amount. He will generally contrive to avoid such a result by offsetting this extraordi-

nary expense of the house by a corresponding extraordinary income from some other source, such as a depreciation fund, and other sources to be mentioned later. A depreciation fund may have been created by setting aside annually throughout the existence of the house a small deposit sufficient to rebuild the house when it is worn out. The great *outgo* for rebuilding is offset by taking out an equally great *income* from the depreciation fund, and the total net income from the " house and lot " and the depreciation fund combined reveals no radical variation. The depreciation fund equalizes the flow of net income from all the property which the individual owns. But it does not *prevent*, it merely *offsets* the large negative balance in the income account of *the " house and lot " considered by itself*. From this single source, — the house and lot, — therefore, the net income is evidently $1000 a year for each of the forty-nine years, and $9500 for the fiftieth year.

§ 3. Devices for making Income Regular

Disturbance of income due to building the house may be avoided, not only by a depreciation fund, but by other devices; for instance, by paying for the house in installments; by borrowing money to defray the cost, and mortgaging the house; or by selling other property. Another method of steadying income — and one which ought to set at rest any further doubt as to the propriety of the present method of accounting — is employed by all accountants when the same owner possesses so many of the articles in question that the reconstruction of one or another of them must occur at short intervals. If a man owns fifty houses, each lasting fifty years, and every year one wears out and has to be rebuilt it is then evident that he will have an expense of $10,000 every year for the rebuilding of a house, which will be a regular item; and he will have a regular income balance as a consequence, because he will get the

benefit of forty-nine houses, which will far outweigh the cost of building only one. The difference will be his net income, which will be a fairly regular amount year after year.

Any large group of wealth involves the same principle. Professor Clark of Columbia University suggests a helpful simile when he compares a stock or fund of capital to a waterfall: the drops of water or component parts of the waterfall or fund are constantly changing, but the waterfall or fund remains about the same.

§ 4. How to Credit and Debit

Before leaving the subject of income accounts, we shall speak of one particular kind of capital, namely, the stock of cash. This will furnish an opportunity to illustrate anew some of the principles of bookkeeping which we have just discussed. What puzzles the novice in bookkeeping is the manner of debiting and crediting a cash drawer. At first this may seem to be the opposite of what should be done. To understand the practice of accountants in this particular is to go a long way toward understanding the main principles of bookkeeping. It will help us to understand it if we liken a cash drawer to a gold mine. We credit a gold mine with all the gold extracted, and we debit it with all the costs put into it. In the case of the gold mine, what it costs to run it is outgo; all of the yield of gold is gross income; and the difference is the net income. Similarly, the gross income from the cash drawer consists of what the cash drawer yields, or whatever comes out of it. It benefits us whenever it pays our bills; it costs us whenever we pay its bills, *i.e.* whenever we pay something into it. All the payments which we have to make *to* the drawer are a cost of that drawer to us, whereas all the payments that we make *by* the drawer are the benefits which it produces for us. What *net* benefit, then, does the cash drawer yield in the

long run? Very little. We pay out just as much as we put in; and if we subtract one amount from the other, the net annual income from the cash drawer will be about zero, unless during a certain year we store up more than we take out, or take out more than we put in.

The reason that these credits and debits of "cash" seem at first the reverse of what they should be is that we are accustomed to think of money receipts and expenditures, not with reference to the stock of cash into or out of which they are paid, but with respect to some other item of wealth on account of which the payments are made. If a lodging house keeper receives $10 from a lodger, she finds it hard to *debit* $10 to "cash." She thinks of the $10 as income; and it is income *with respect to her lodging house*, for the latter has yielded it to her. Her stock of cash, however, has not yielded it to her. On the contrary, it has taken it from her. Later on it will yield it back, and at that time should be credited.

The income from a man's property should be put down in his income accounts separately for each item of capital he owns, and opposite every such article of capital should be put down a credit and debit. Not only should we include both positive and negative income, but we should include both positive and negative items of capital. The negative items are the liabilities. Liabilities yield a net outgo instead of a net income. In order, then, to find out the net income of any person during a certain day or month or year, the proper method is to make a complete statement of all his assets and all his liabilities; and for each asset as well as each liability, credit all the benefits and debit all the costs. The net result will be the net income of the person.

A real person will have a net income, but a fictitious person will not. We have seen, in the case of fictitious persons, that there is no net capital because the liabilities always equal the assets; for what is called the capital of a "company" really means the capital of its stockholders. As

there is no net capital because the " company " owes it all to the stockholders, so there is no net income, because the " company " pays its all to the stockholders.

The following is an imaginary income account of a railroad company: —

INCOME ACCOUNT OF A RAILROAD CORPORATION

INCOME		OUTGO	
By passenger and freight service	$1,246,147	To operating expenses	$800,000
		To interest to bondholders	100,000
		To dividends to stockholders	200,000
		To surplus applied to (1) purchase of land	140,000
		(2) cash paid into treasury	6,147
	$1,246,147		$1,246,147

The passenger and freight service yields $1,246,147. That is the gross income of the road. All the benefits flowing from that road are worth this amount of money. On the other side of the railroad account we find the costs of the road to the company; they exactly equal the benefits, for the company is an abstraction, — a mere holding concern,— not a real individual. The outgo consists of operating expenses — $800,000; interest to bondholders, $100,000; dividends to stockholders, $200,000. The words *by* and *to* are usual in income accounts. The receipts are benefits, and come *by* virtue of the services designated, and the costs represent something which has to be given *to* these several items in order to make the benefits possible. These items leave a surplus, part of which is expended for land ($140,000); this is a cost just as much as anything else. Then there is cash left in the treasury to the amount of $6147. It must not be concluded that this cash is a net income. The cash drawer swallows it up. The company loses $6147, so to

speak, in feeding its cash drawer. Therefore the two sides of the account balance, and there is no net income at all.

§ 5. Omissions and Errors in Practice

Practically, however, it is not convenient to put in an income or a capital account everything which theoretically ought to be entered there. Moreover, capital and income accounts are not always treated consistently in practice. For instance, in a capital account a man would not put in his own person, and yet in his income account he will put in the money he earns or the work that he does. That is, work and wages are put in the income accounts, but the corresponding items which do this work or earn these wages are not put in the capital accounts. The correspondence between the two accounts is therefore covered up. On the other hand, a man never enters in his income account the shelter of his own house as a benefit, and yet he may include the house among his assets in his capital account. In ideal accounting we should insist upon recording every benefit of any kind, every cost, and every source of benefit or cost. Adam Smith, the great classical economist, fell into error when he said that a dwelling yields no income, but is a source of expense. Evidently he had in mind only those costs and benefits which come in the form of money payments. We certainly get no *money* benefits by living in our house, while we do suffer a *money* cost to run it. So far as money receipts and expenditures are concerned, therefore, the house costs more than it brings in. But no man would keep his house if it did not afford him benefits greater than its costs. We should therefore appraise the shelter of the house and enter this as its gross income. The absurdity of not counting the shelter of a house as income is particularly apparent if we note that Adam Smith, like all other economists, includes under income the rent or money income that the owner gets from a house which is rented. They would

have said that a man who enjoys shelter gets no income, but if he gets paid for the shelter enjoyed by another man, he does get income. This results in the absurd conclusion that if I live in my own house and you live in your own house, neither of us receives any income; but if you rent your house to me and I rent mine to you, then we shall each be receiving income! Obviously the income is really there all the time, in the form of shelter, and when one man rents another man's house he gets the shelter-income and gives the other man a money-income in its place.

An account of money received and expended can furnish a complete picture of income only when two conditions exist; namely, that all the income is in the form of money, and all the outgo is for personal satisfaction. Under these conditions the cash drawer and the cash account is a kind of money meter of income. These conditions are approximately fulfilled when people live in a city and do not own their own houses or furniture. Such people get practically all of their income from their salaries, dividends, and interest, all in the form of money receipts. This money is spent for benefits, food, clothing, theater going, etc. These operations are essentially all. To be sure, the cash drawer (or bank account) intervenes between the money-income on the one hand — the receipts of salaries, dividends, and interest — and the final form into which these are converted by expenditure on the other hand; but the bank or cash drawer intervenes only as a cogwheel intervenes to transmit motion from one part of a machine to another. In strict accounting, the bank or drawer should be debited with all the money flowing into it from salaries, stocks, and bonds and credited with the expenditures. But these opposite sums approximately offset and so cancel each other.

The only method, then, of constructing income and outgo accounts which shall be correct and which can serve as a basis for economic analysis is the method already indicated — the method by which are recorded, for each article of

capital, the values of *all* its benefits and *all* its costs. These benefits and costs are of many kinds. Sometimes they consist of money payments — not in themselves enjoyable to anybody; sometimes they consist of merely productive operations, and sometimes of truly enjoyable elements. All these elements should be entered in the accounts on the same footing; but we shall see that after being thus entered they may be so combined that all except the " enjoyable " elements will cancel among themselves.

CHAPTER V

ADDITION OF INCOME

§ 1. "Methods of Balances" and "Couples." "Interactions"

We have now learned how to reckon the income of either a real or a fictitious person. Of reckoning the income of society there are two ways, corresponding to the two ways of reckoning society's capital; *i.e.* the method of balances and the method of couples. The method of balances is very easy to understand. All that is necessary is to make up an income account for any given period for each instrument or each owner so as to include all possible income or outgo in the society under consideration and, taking from each individual account the net balance, add these net results together. The result is the total income of society. Its constituent parts are the net incomes from each instrument or owner in society.

The "method of couples" is somewhat more difficult to follow. But it is also more important. Just as the same item in capital accounts is both asset and liability, according to the point of view, and is therefore self-canceling, so the same item in income accounts is both benefit and cost, and is, therefore, likewise self-canceling. In fact, the reader may have felt that, in many of the examples cited, what we called costs were really benefits. He may have asked himself: Why should we call rebuilding a house a cost? When a carpenter and his tools repair it, do we not credit him and them with a service performed? Is not any production a benefit? Have we not, then, placed repairs on the wrong

side of the ledger? It depends upon which of two accounts we are considering. When a carpenter with his plane, hammer, and saw helps to rebuild a house, we have to consider two groups of capital. One group, the carpenter and tools, is acting on the other group, the house. The *carpenter and tools* certainly perform a service or benefit, but the *house* does not. Considered as occasioned by the *house*, the repairs are costs. The house absorbs or soaks up these costs, promising to compensate for them by benefits to be yielded later on. The renailing of loose shingles is certainly not what the house is for; with respect to the house, it is a necessary evil; with respect to the hammer, however, it is a service rendered. Therefore the repairing of the house is at once a benefit and a cost.

Such double-faced events are so important as to require a special name. We shall call them *interactions* between two instruments or groups of instruments.

An *interaction*, then, is a benefit or service of the acting instrument, and a cost or disservice of the instrument acted on. There can never arise the slightest doubt as to when it is to be regarded as positive and when negative. The definitions of benefit and cost settle this question in each case by referring it to the desire of the owner. Since the house owner desires that the house should *not* occasion repairs, these repairs are costs of the house; and since the tool owner desires that the tools *should* occasion repairs, such repairs are the benefits of those tools.

The example given is typical of the general relations between interacting instruments. The mental picture we should construct is that of two distinct groups of capital. Group A acts on, and so to speak, benefits Group B. Whatever the nature of this interaction, A is credited with it as a benefit and B is debited with it as a cost. These two items of credit and debit are equal and simultaneous.

Interactions involving this mutual cancellation constitute the great majority of the elements which enter into income

and outgo accounts. The only benefits which are not merely the positive side of such canceling interactions are *satisfactions* — desirable conscious experiences — often miscalled " consumption " ; and the only costs which are not the negative side of such canceling interactions are " labor and trouble." But these two final elements — " satisfactions " on the one hand and " labor and trouble " on the other — are only the outer edges of the series. Between them is a connective chain of repoductive processes and commercial transactions, every link of which has two sides, a positive side of benefits or services and a negative side of costs, always self-canceling.

§ 2. Interactions which change the Form or Position of Wealth (Production and Transportation)

The interactions between two articles or groups of articles are of three chief kinds : changes in the form of wealth, changes in the position of wealth, and changes in the ownership of wealth ; in other words, transformation, transportation, and transfer or exchange. These we shall take up in order, and show how each is an interaction, two-faced.

First, what is here called transformation of wealth is practically identical with what is usually understood by " production " or " productive processes." By this transformation of wealth, or changes in its form, is meant the changes of relative position of its parts. Weaving, for instance, is the transformation of yarn into cloth by a rearrangement in the relative position of the warp and woof. Spinning, likewise, consists of moving, stretching, and twisting fibers into yarn ; sewing, of changing the position of thread so that it may hold cloth together ; and so it is with carding, wool sorting, shearing, and all the other operations which constitute the manufacture of fabrics. All these— all manufacture and all agriculture — consist simply of a series of transformations of wealth, each transformation

two-faced. On the part of the *transformed* instrument or instruments the transformation is a cost; on the part of the *transforming* instrument or instruments it is a benefit. So it is, not only when a carpenter and his tools build or repair a house but also when the painter decorates it or the janitor cleans it, or when a cobbler transforms leather into shoes, or when a bootblack transforms dirty shoes into clean and polished ones, or when a loom produces cloth out of yarn, or when land renders a service in producing wheat.

The principle is not altered when the interaction consists not in producing a change but in preventing one. A warehouse renders its service as means of storing bales of cotton, *i.e.* protecting them from the elements; and this storage is, on the part of the stock of cotton, an element of outgo, or expense, as on the part of the warehouse it is an item of income.

Nor is the principle altered when there are, as is indeed usually the case, more articles than one in either or both of the two interacting capitals. Plowing, or the transformation of land into a furrowed form, is performed by a plow, a horse, and a man. The plowing is a cost debited to the land on the one hand, and at the same time a service credited to the group of capital consisting of the plow, horse, and man on the other.

Nor is the principle altered if one or more of the transforming agents perish in the transformation and another comes for the first time into existence. Bread making is a transformation debited to the bread and credited to the cook, the range, the flour, and the fuel, of which the last two are consumed as soon as they perform their services. Agents which disappear in the transformation, but reappear in whole or in part in the product, are called "raw materials." The production of cloth from yarn is a transformation effected by means not only of the loom but also of a number of other agents, among them the yarn itself, which thus vanishes as yarn and reappears as cloth. The cost of weaving includes as cost this consumption of raw material — yarn; and

this consumption of yarn, on the part of the yarn itself, is not cost but service. It is the use for which the yarn existed. When cloth is turned into clothes, this transformation is a service to be credited to the cloth, and a cost to be debited to the clothes. All raw materials yield benefits as they are converted into finished products. Their conversion is, however, on the part of these products, always outgo and not income.

In this way, when an article passes through various stages of production, the designation of these stages is often an arbitrary matter. A "sapling" grows into a "tree". We may, if we choose, consider the sapling as one category and the tree as another. In this case the "sapling" yields a benefit the moment it becomes a "tree"; but no effect on social income is produced, because, if we credit the sapling with the value of the tree, we must debit the tree with the cost of the sapling. Likewise we may arbitrarily designate the moment when a "calf" becomes a "cow," or when "new" wine becomes "old," without disturbing the income amounts of society; for such events are always two-faced and cancel themselves out in the total. We may, in fact, mark any stage whatever in the course of production by an arbitrary line, and regard the passage across this line as a service on the part of the capital on one side of the line — the earlier side — and a cost on the part of the capital on the other side.

A closely related class of interactions is transportation, or changes in the position of wealth. It is a very slight distinction which separates this class from the preceding class. Transforming or producing wealth consists of changing the position of its parts as related to each other; transporting wealth consists of changing the position of that wealth as a whole. But "part" and "whole" are themselves loose and relative terms. Bookbinding is a transformation or production of wealth; it assembles the paper, leather, thread, and paste into a whole book. Delivering the finished book

to a library is transportation. Yet the library is, in a sense, a whole; and to assemble books into a classified and organized library is to make a whole out of parts. The distinction between transformation and transportation is thus merely one of convenience. Many writers prefer to include them both under "production." We prefer to include them under the less ambiguous and more inclusive head of "interactions," and our object here is not to emphasize their difference but their similarity. The same principle of equal and opposite services applies to both. The following are examples of transportation: When merchandise is transmitted from one warehouse to another, the first warehouse is credited with the change and the second debited. The warehouse which has rendered up the merchandise has done a service; that which has received it is charged with a cost. A banker who takes money from his vault and puts it in his cash drawer will, if he keeps separate accounts for the two, credit the vault and debit the till. When wheat is imported from Canada, that nation is credited, and the United States is debited, with the value of the wheat. As in the case of continuous productive processes, so in the case of continuous transportations, we may divide up transportation districts by arbitrary lines, and consider the passage of any articles across those lines as interactions.

§ 3. Interactions which change the Ownership of Wealth (Exchange)

The third class of interactions is the change of ownership of wealth or of property. This has been called *transfer*. Transfers usually occur in pairs, and involve two objects transferred in opposite directions between two owners. This double transfer we have called an exchange. Since an exchange consists of two transfers, and since a transfer is a species of interaction and as such is self-canceling, every exchange is self-canceling and cannot of itself contribute

anything to the total income of society. When, for instance, a bookseller sells a book, he credits his stock with the fact that it has brought in money, and the customer debits his library to the same amount.

These two items constitute the transfer between the stock of books of the dealer and the stock of books of the customer. The remaining two items constitute a transfer between the stocks of cash of the two men; the dealer debits his "cash" and the customer credits his.

When, therefore, an article of wealth changes hands, whether it be money or something else, it occasions an element of income to the seller and an element of outgo to the purchaser, and therefore no income at all to society. The effect of canceling these items — the credit item of the seller and the debit item of the purchaser — is to free the income account of that article from all entanglements with exchange, to wipe out all money-income, and to leave exposed to view the "*natural*" income of the article. Thus books yield their natural income, not when the book dealer sells them, but later when the reader peruses them. The sale is a mere preparatory service, a credit item to the book dealer and a debit item to the buyer. Again, a forest of trees yields no natural income until the trees are felled and pass into the next stage of logs. The owner of the forest may, to be sure, "realize" on the forest long before it is ready to be cut, by simply selling it to another; and to him the forest has then yielded income; but, as the purchaser has suffered an equal outgo, the net result of this interaction, as of every other, is zero.

The *rent* of a rented house is, for society, not income at all. It is income to the landlord but outgo to the tenant — outgo which he is willing to suffer solely because of the shelter he receives. This shelter alone remains as the income from the house after the rent transaction is canceled out between the two parties concerned. The shelter-income is the essential and abiding item, and without it there could be no rent-income to the landlord.

Again, a railway yields as its natural income solely the transporting of goods and passengers. Its owners sell this transportation service for money, and regard the railway simply as a money maker; but to the shippers and passengers this same money is an expense, and exactly offsets the railway's money earnings. Of the three items —money-income of the road, money-outgo of its patrons, and transportation — the first two mutually cancel and leave only the third, transportation, as the real contribution of the railway to the sum total of income.

We see, then, that the method of couples, applied to buyer and seller, denudes all capital of its so-called "money-income," and lays bare the only income it can naturally produce. We see that capital is not a *money-making* machine, but that its income to society is simply its services of production, transportation, and gratification. The income from the farm is the yielding of its crops; from the mine, the production of its ore; from the factory, its transformation of raw into finished products; from commercial capital, its passage of goods from producer to consumer; from articles in consumers' hands, their enjoyment or so-called "consumption."

Similar principles apply to *outgo*, no part of which, for society, occurs in money form. The great bulk of what merchants call "cost of production," expense, or outgo, consists of money costs which, as concerns society, carry with them their own cancellation. For manufacturers, merchants, and other business men, almost every outgo is an expense, *i.e.* consists of a money payment. Such money payments are for wages, raw materials, rent, and interest charges, all of which are incomes for other people. The wages are the earnings of labor; the payment for raw material is received by some other manufacturer; the rent is received by the landlord; the interest charges by the creditor.

§ 4. Accounts illustrative of so-called Production

Not only do exchange transactions completely cancel themselves out in reckoning total income, but the great majority even of the *natural* benefits of capital do the same. Even these natural benefits of capital consist for the most part of " interactions "; they are transformations or transportations of wealth. They are intermediate stages, merely preparatory to the final enjoyable benefits of wealth, and, after the interactions have been canceled out, do not enter as items either on the income or outgo side of the social balance sheet.

In order to show the effect of canceling out the equal and opposite items entering into every interaction throughout all productive processes, let us observe the various stages of production which begin with the forest above referred to. The product of the forest, its gross income, is the series of events called the *turning out of logs*. This log production is a mere preparatory service, a credit item to the forest and a debit item to the stock of logs of the sawmill, to which they next pass. As the sawmill turns its logs into lumber, the lumber yard is debited with the production of lumber, and the sawmill is credited with its share in this transformation. Intermediate categories may, of course, be created, and we may follow, in like manner, the further transformation, transportation, and exchange to the end of the stages of production, — or rather, to the ends; for these stages split up and form several streams flowing in different directions. To follow only one of these streams, let us suppose that the lumber which goes out from the yard is used in repairing a certain warehouse. The warehouse is used for storing cloth; the cloth goes from the warehouse to the tailor; the tailor converts the cloth into suits for his customers; and his customers receive and wear those suits. In this series, all the intermediate services cancel out in " couples " and leave as the only uncanceled element, or

final fringe of services, the use of clothes in the consumers' possession.

Should we stop our accounts, however, at *earlier* points in the series, the uncanceled fringe at which we should find ourselves would be not consumers' services, but the positive side of some intermediate service or interaction whose negative side would not appear, as it would belong to a later stage in the series. These facts will be clear if we put the matter in figures, stage by stage. The following are the items for the logging camp above mentioned, in the accounts of its owner: —

INCOME ACCOUNT FOR LOGGING CAMP

INCOME	OUTGO
Production of logs $50,000	(Omitted)

The gross income from the logging camp, considered by itself, and without any deductions for expenses, is here seen to consist in the production of $50,000 worth of logs. If, however, we combine the logging camp with the sawmill, we shall have accounts like the following, in which, to avoid irrelevant complications, no account is taken of any expenses which do not happen to be interactions between the groups of capital considered: —

INCOME ACCOUNT FOR LOGGING CAMP AND SAWMILL

CAPITAL SOURCE	INCOME	OUTGO
Logging camp . . .	Yielding logs to sawmill . . . $50,000	
Sawmill	Yielding lumber to lumber yard $60,000	Receiving logs from camp . . $50,000

In this case, canceling the two log items, we have left only the lumber item; *i.e.* the income from the combined logging

camp and sawmill consists only of the production of lumber, its final product. The transfer of logs from one department to the other no longer appears. This transfer is like the taking of money from one pocket and putting it in another, — a fact which would be particularly evident in case the logging camp and sawmill were combined under the same management.

Extending the same principles to the entire series, we have the accounts as given in the table on the next page.

In this table we may successively cancel each pair of items constituting an interaction. An item on the left is the positive side of an interaction of which the item on the right in the line next below is the negative side. Thus, the $50,000 in the first line on the left cancels the $50,000 in the second line on the right. Similarly, the two items of $60,000 cancel in the lines next below, respectively. If we stop after the first two cancellations, using only the first three lines of the table, we shall find that the net income from logging camp, sawmill, and lumber yard consists only of the production of retail lumber, $70,000; it does not include either the transfer of logs or the transfer of wholesale lumber. In like manner, if we proceed one stage further, that is, if we stop our cancellations at the end of the first four interactions, the production of retail lumber no longer appears as an element of income; and so on, step by step to the end, when the only surviving item will be the "wear" of the suits.

It is, of course, true that in any actual accounts there will be other items besides those which have been exhibited in this simple, chainlike fashion. Were it worth while, we might insert these additional entries of income and outgo elements. Most of them would likewise consist of the positive or negative side of interactions; and if we were to introduce their respective mates, the opposite aspects of the same transactions respectively, it would be necessary to include the accounts of still other instruments. If we should follow up all such leads, we should soon have instead of the simple

INCOME ACCOUNT FOR A SPECIFIED SERIES OF INSTRUMENTS FOR 1910

CAPITAL SOURCE	INCOME		OUTGO	
Logging camp	Yielding logs to sawmill	$ 50,000		
Sawmill	Yielding lumber to lumber yard	60,000	Receiving logs from logging camp	$ 50,000
Lumber yard	Yielding lumber to warehouse	70,000	Receiving lumber from sawmill	60,000
Warehouse	Warehouse shelter to cloth	80,000	Receiving lumber from lumber yard	70,000
Stock of cloth in warehouse	Yielding cloth to tailor	90,000	Shelter from warehouse	80,000
Stock of cloth of tailor	Yielding suits to customers	100,000	Receiving cloth from stock	90,000
Stock of clothes of customers	Yielding "wear"	110,000	Receiving suits from tailor	100,000

chain represented in the table, an intricate network of related accounts. But the same principle of the interaction as a self-effacing element would apply.

§ 5. Preliminary Results of combining these Income Accounts

The table given will throw light on the question: Of what does income consist? This question is not a thoroughly definite one. But if we ask instead: Of what does the income *from a particular group of capital* consist? we shall make the question definite. Whether the production of logs is income or not depends upon the point of view. It is income from the first link of capital in our series (the logging camp); it is not income from the first two links combined, for in the second link it occurs as outgo. Likewise, the use of the warehouse is income with respect to the first four links of capital, but is not income with respect to the first five links.

We see, therefore, that in reckoning up the income from any group of capital we may as well omit all interactions taking place *within* it, and confine ourselves to the outer fringe of services performed by the group as a whole. As the group is enlarged, this particular outer fringe disappears by being joined to the next part of the economic fabric, and another still more remote fringe appears. The question then arises: When is the economic fabric complete, and has it any final outer fringe? But the answer to this question must be postponed.

Contrasting the method of couples with the method of balances, we may say that the method of couples is useful in showing of what elements income consists in any given case. The method of balances, on the other hand, is useful in exhibiting the amount of income contributed from each capital source. The two methods, as applied to the example just given, are as follows: —

METHOD OF BALANCES

CAPITAL	INCOME	OUTGO	NET INCOME
Logging camp	$ 50,000		$ 50,000
Sawmill	60,000	$ 50,000	10,000
Lumber yard	70,000	60,000	10,000
Warehouse	80,000	70,000	10,000
Stock of cloth in warehouse	90,000	80,000	10,000
Stock of cloth of tailor . .	100,000	90,000	10,000
Stock of clothes of customers	110,000	100,000	10,000
			$ 110,000

METHOD OF COUPLES

INCOME	OUTGO
$ 50,000	
60,000	$ 50,000
70,000	60,000
80,000	70,000
90,000	80,000
100,000	90,000
110,000	100,000

The two methods — balances and couples — show the same result, but from different points of view. By means of the method of balances we are enabled to see what part of the final net income is *contributed* by each of the articles in the group. By means of the method of couples, we are enabled to see of what the net income from the entire group of articles *consists;* canceling by the oblique lines, we have left but one item, $110,000, representing the "wear" of the suits.

The two methods must not be confused. When we find by the method of couples that the net income of $110,000 consists exclusively of the use of suits of clothes, this does not by any means imply that this net income is all of it *due*

to the stock of clothes. To discover to what it is due recourse must be had to the method of balances. We then see that only $10,000 of it is due to the stock of clothes, the remainder being due to the other capital instruments in the table, which made the clothes possible, and most of all ($50,000) to the logging camp. Combining the results of *both* methods, we may state that the total net income from the specific group of instruments *consists* of $110,000 worth of " wear " of suits and that this *is due* partly to the stock of clothes and partly to other capital. Of course our table does not give all the capital to which the wear of the suits is indebted. We have, as already noted, omitted for the sake of simplicity all items of cost which do not belong to our chosen series. But the inclusion of other items, while it complicates the accounts, does not change the principle of cancellation. It merely introduces other chains of interaction.

The two methods correspond in a general way to the two methods for canceling liabilities and assets in capital accounts. The method of balances gave, it will be remembered, the amount of capital belonging to each individual; the method of couples showed of what elements the total capital consists.

§ 6. Double Entry in Accounts of Fictitious Persons

We have now followed the cancellations to which interactions lead, whether they be interactions of exchange or of production. The case of exchange, however, needs further consideration. Since every exchange consists of two transfers, and every transfer of two items, a credit and a debit, the exchange evidently consists of four items in all, two of which are credits and two of which are debits. These four may be paired off in two ways, only one of which has thus far been mentioned. They stand, as it were, at the four corners of a square, as in the following scheme, which shows the credits and debits involved when goods worth $2 are sold.

The dealer credits his stock of goods and debits his "cash," while the buyer does the opposite.

	Stock of Goods	Stock of Cash
Seller	+ $ 2	− $ 2
Buyer	− $ 2	+ $ 2

The two transfers into which any exchange may be resolved are represented by the two columns of the table. But an exchange may also be resolved into two pairs of items represented by the two horizontal lines of the table. The items in the same horizontal line record the part taken in the exchange by one of the two persons participating in it.

Every exchange, then, consists of four items, and may be resolved either into two transfers (one for each property exchanged) or into two transactions (one for each party to the exchange). The first resolution has been considered; we proceed now to the second.

The following account represents the entries during a given year for a dry goods company. In this account we observe that every item on the income side is balanced by an equal and opposite item on the outgo side. All items thus paired are represented by the same letters, the capitals being used for positive items and the small letters for negative.

Income and Outgo of Dry Goods Company for 1910

Capital Source	Income	Outgo
Stock of goods	By Goods sold $10,000 *A*	To goods bought $5,000 *b*
Cash	By cash taken out for: Purchases $ 5,000 *B* Profits . $ 2,000 *C*	To cash received from sales . . . $ 10,000 *a*
Capital Stock .		To profits paid $ 2,000 *c*

The rule we have learned in Chapter IV for making complete income accounts is to start with the capital account, taking each item of assets and each item of liabilities, and to enter for each item of either kind all the items of income to which they give rise — plus or minus. For simplicity, it is assumed that, instead of fifty or one hundred different items of capital, there are only three items; namely, the stock of goods, the stock of cash, and the "capital stock," which is a liability item. The stock of goods yields $10,000 worth of sales. But, on the other hand, it costs $5000 to replenish this stock of goods. Therefore it is credited with a plus item of $10,000, and debited with a minus item of $5000. The student will notice that each item is entered twice, once on each side. This "double entry" is a necessary feature of the income accounts of fictitious persons, and has long been observed in practical accounting. It follows that the doubly entered items may be mutually canceled, *A* cancels with *a*; that is, though the stock of goods are credited with bringing in $10,000 (*A*) in cash, the cash drawer must be debited with the $10,000 (*a*) which it swallows up. Likewise the stock of goods costs $5000 (*b*), which must therefore be debited to it; but the cash drawer has to supply the $5000, and is therefore credited with 5000 (*B*), so that item *B* cancels with *b*. Finally, when the profits are paid, they also come out of the cash drawer, and the cash drawer is credited with exactly that amount, $2000 (*C*), while the capital stock is debited with that amount as a cost (*c*). So we see that all items cancel each other in pairs. The two sides of the account of such a fictitious person necessarily balance. Even if the company accumulates its profit instead of paying it to the shareholders, the two sides still balance; for, as has been seen, the money thus received is then debited to the cash account.

§ 7. Double Entry in Accounts of Real Persons

In the case of real persons, however, the two sides do not balance, for the accounts do not then consist solely of double entries. To show this, let us consider the accounts of a real person as given in the next table. In these accounts, as in the previous ones, which are much simplified, we have indicated the like items on opposite sides by like letters, the positive items being represented by capitals and the negative by small letters. We observe that, as in the corporation

INCOME AND OUTGO OF A REAL PERSON

CAPITAL SOURCE	INCOME	OUTGO
Stocks and bonds -	Receipt of money from stocks and bonds $2000 *A*	Money expended for stocks and bonds . $ 500 *d*
Lease right . .	Shelter . . . . $ 100 [*B*]	Money rent paid . . . $ 100 *e*
Food	Use of food . . . $ 150 [*C*]	Money cost of food . . $ 150 *f*
"Cash" . . .	Paid out for bonds $ 500 *D*	Receipt of money from stocks and bonds . $2000 *a*
	Paid out for rent . $ 100 *E*	Receipt of money for work done . . . $2000 *g*
	Paid out for food . $ 150 *F*	
Self	Receipt of money for work done . . . . $ 2000 *G*	

Uncanceled items: Shelter [*B*] . . $ 100
Use of food [*C*] $ 150

accounts, many of the items will "pair." But, unlike corporation accounts, the present accounts contain a residue of items which *will not pair*. The letters representing these unpaired items are designated by being inclosed in square brackets. They show that [*B*] and [*C*] — the shelter of the house, and the use of food — constitute a kind of income which does not appear elsewhere as outgo.

When studying the accounts of *instruments*, we found in considering the chain of productive services of a lumber camp, etc., that there always remains some outer fringe of uncanceled income. We have now reached this same kind of outer fringe in studying the accounts of *persons*, provided they are real persons. This outer fringe consists of the final benefits of their instruments. All other items are merely interactions preparatory to such final benefits, and pass from one category of capital to another. Thus the income from investments, being deposited in bank, is outgo with respect to the bank account; the bank account yields income by paying for stocks and bonds, food, etc., but in each case the same item enters as outgo with respect to these or other categories of capital. In all these cases the individual receives no income which is not at the same time outgo. It is only as he consumes the food, wears the clothes, or uses the furniture, that he receives income. And these final benefits are, of course, the end and goal of all the preceding economic processes and activities.

§ 8. Final Enjoyable Income

The stage at which we have just left income may be called the stage of final objective services. In other words, it is the stage at which the wealth of the objective world at last acts upon the physical person of the recipient. This final objective income is that of which the economist is usually in search, and is that which the ordinary statistics of workingmen's expenditures represent. It is clear from what has been

said, that in the final net income which we derive from wealth all interactions between different articles of wealth drop out, — all the transformations of production, such as the operations of mining, agriculture, and industry, all the operations of transportation, and all business transactions or exchanges. For in all such cases the debits and credits inevitably occur in pairs of equal and opposite items. Each pair consists of the opposite facets of the same interaction. The only items which survive are the final personal uses of wealth. Let us call these the *last benefits outside ourselves*. Examples of such benefits are benefits of nourishment, benefits of housing and warming, benefits of clothing, benefits of personal attendance.

But the economist, in his analysis, must not stop here — outside ourselves. There is one step more before the process is complete. Indeed, no benefits outside ourselves are of significance to us except as they lead to *satisfactions*, and these can only exist *within* our minds.

Now these *final* benefits come to our minds through our bodies. No agent outside the body can yield them. All that persons or things outside of man can do is to stimulate his bodily organism. What are called benefits of amusement or instruction cannot amuse or instruct the mind save through bodily agencies. An "instructive book," for instance, is powerless to instruct. It can render its benefit simply and solely by reflecting light into the eye of the reader. It is necessary that these stimuli on the optic nerve should be transmitted through the nervous system and brain before any mental instruction takes place. So a piano can of itself produce no sensations of tone. It merely produces vibrations outside ourselves which, through the ear and auditory nerve, ultimately result in sensations within us. All sound, sight, taste, smell, touch, come about through reactions of the nervous system to stimuli. We must, therefore, to make our accounts complete and final, include the debits and credits of our own persons. When we do so,

we immediately see that, just as the credits of the logging camp are the debits to the sawmill, so the credits of our outer possessions are really the debits of our bodies. A man who receives a Turkish bath must credit the bath to the water, towels, attendants, and other coöperating agencies by which he gets it, but he must debit his body with the bath as one of the costs his body occasions him. The bath is simply an interaction, between the towels, etc., and his body. Like all interactions, their purpose is that later there may be experienced pleasant sensations or the avoidance of unpleasant ones, in this case the exhilaration and enjoyment of good health. Similarly, the use of clothing and shelter leads ultimately to the prevention of the sensation of cold, but their immediate service is simply to hinder the dissipation of heat from the body. They are costs of the body, just as the care and protection of a horse are costs of the horse.

Likewise medicine is a cost to the body. Its services are (or are supposed to be) the repairing of the body, and, although credited to the medicine, should be debited to the body, just as the services of a carpenter are credited to him but debited to the house which he mends. The "consumption," or use of food, though it is a service of the food, is a disservice of the body; for food stands in the same relation to the body as fuel to a furnace or repairs to a house. The final income consists of the subjective satisfaction of the appetite and the other satisfactions which the taking of food enables the body to yield to the mind. These include not simply the immediate gratification of the palate, but the promotion of pleasant sensations or the avoidance of unpleasant ones later on. In other words, the consumption of food, by preserving health and maintaining life, enables the body to yield better and longer-continued service to the mind in future years, just as the repairs on a house enable it to yield shelter a long time after the repairs are made. These and other illustrations will show that, if we include the body as a transforming instrument, while we must credit

with their respective services all these outside agencies, such as food, clothing, dwellings, furniture, ornaments, and other articles which, as it were, bombard a man's sensory system, we must at the same time debit the body with these same items. The benefits or services of food, clothing, houses, still lie outside ourselves. But when they come to be actually used to satisfy wants, they are translated, as it were, into subjective benefits; *i.e.* into something inside the human mind. After this point, income can be expressed only in terms of human consciousness, having passed the threshold of the outside, objective world.

The only surviving credit items, after these equal debits and credits are canceled, are the resulting final satisfactions in the mind. In other words, in order that the external world should become effective to man, the human body must be considered to be the last transforming instrument. Just as there is a gradual transformation of services through the farm, flour mill, and bakery, so is there a final transformation within the human body itself. It is a sort of factory, the products of which are the only final uncanceled income of the consumer. In a complete view of productive processes, the human machine is no more to be left out of consideration than machines which handle the wheat in its prior stages.

All objective income is then entirely erased or negatived as soon as we apply our accounting to the body of the recipient. The benefits of which that income consists empty out, as it were, into the human body, but the ultimate result is not actually felt until it appears in the stream of consciousness.

Final income, then, is simply the stream of consciousness of any human being. All his conscious life, from his birth to his death, constitutes his subjective income. Sensations, thoughts, feelings, volitions — in fact, all mental events — are a part of this income stream. All conscious experiences which are *desirable* are positive items of income;

they are final benefits. All which are *undesirable* are negative items; they are costs.

When we say that mental satisfactions are the goal of all economic processes, we mean that they are the object at which men aim. In the deeper economy of the universe these satisfactions may, in turn, be the beginning of more important chains of events. But economic analysis ends with the motives which actually sway men's actions, not with ultimate consequences of their acts. The satisfaction of the desire for food *should* lead to the preservation of the individual, but it *may* lead to the impairment of his health. The satisfaction of the sexual appetite should lead to the preservation of the race, but it may lead to its degradation. Nature, or natural selection, seems to have implanted many appetites merely as baits to serve ulterior purposes. But to the individual the satisfaction of these appetites may be the farthest end he individually has in view. Whatever is the ultimate end in view for the satisfaction of the individual's desires is then "final" only so far as our present analysis is concerned.

We have now reached a convenient place in which to emphasize a point of great importance, but one which is seldom understood, namely, that most of what is called "cost of production" is, in the last analysis, not cost at all. We have found, in using the method of couples, that every item of cost outside ourselves is also an item of income, and that in the final total *no such items survive cancellation*. It costs the baker flour to produce bread; but the cost of flour to the baker is income to the miller. To society as a whole it is not cost nor benefit, but a mere interaction. Similarly of wages; the employer counts his pay roll as cost of production, but the laborer counts it as earnings. To society as a whole, wages are neither cost nor benefit.

In the last analysis payments of wages, interest, rent, or any other payments from one member of society to another must not be thought of as costs to society as a whole. This

fact should now be clear; yet it is commonly overlooked. When people talk of the cost of producing coal or wheat, they usually think of money payments. The only ultimate item of cost is *labor* cost, or if the term "labor" be not sufficiently broad, labor, anxiety, trouble, annoyance, and all the other mental experiences of an undesirable nature which are undergone in order that mental experiences of an agreeable nature may be secured. Perhaps the best term to comprise the undesirable feelings undergone for the sake of gaining desirable feelings later on is the term "efforts." We may conclude, therefore, that in the last analysis *income consists of satisfactions and outgo of efforts* to secure satisfactions. Between efforts and satisfactions may intervene innumerable interactions, but they all must cancel out in the end. They are merely the machinery connecting the efforts and satisfactions. At bottom, economics treats simply of efforts and satisfactions. This is evident of an isolated individual like Robinson Crusoe, who handles no money; but it is equally true of the most highly organized society, though obscured by the fact that each member of such a society talks and thinks in terms of money.

CHAPTER VI

CAPITALIZING INCOME

§ 1. The Link between Capital and Income

We have now learned what capital and income are and how each is measured. We have seen that the term "capital" is not to be confined to any particular part or kind of wealth, but that it applies to any or all wealth existing at a given instant of time, or to property rights in that wealth, or to the values of that wealth or of those property rights. We have seen that income is not restricted to money-income, but that it consists simply of the benefits of wealth. We have seen that, like capital, income may be measured either by the mere quantity of the various benefits or by the value of those benefits. We have seen that in the addition both of capital-value and of income-value there are two methods available for canceling positive and negative items, called respectively the "method of balances" and the "method of couples." By the method of balances the negative items in any individual account are deducted from the positive items in the same account, and the difference or "balance" gives the net capital (or income, as the case may be) with which that account deals, whether this net capital (or income) pertains to a particular owner or to a particular instrument. The method of couples, on the other hand, cancels items in pairs and is founded on the fact that, as to capital, every liability relation has a credit as well as a debit side, and that, as to income, every interaction is at once a benefit and a cost.

We observed that the method of couples, fully carried out, reveals wherein capital and income ultimately consist.

This method, applied to capital, gradually obliterates all partial rights, such as stocks and bonds, and exposes to view the concrete capital-wealth of a community. The same method applied to income obliterates the "interactions" such as money payments between persons, and exposes to view an uncanceled outer fringe of benefits and costs. If the method is continued further, it leaves simply the final benefits of the wealth outside of ourselves poured, so to speak, into the human organism; while, if the method be pushed to the utmost limits, so as to include this organism itself within the accounts considered, it leaves simply the pleasant and unpleasant experiences of human consciousness, the satisfactions and the efforts of life.

We have seen that capital and income are in many respects analogous, and are strictly correlative; that all capital yields income and that all income flows from capital — at least when the term "capital" is used in its broadest sense, which includes human beings.

In spite of this close association between them, capital and income have thus far been considered separately. The question now arises: How can we pass from capital to income or from income to capital? The bridge or link between them is the *rate of interest.* The rate of interest is the ratio between income and capital, both the income and the capital being expressed in *money value.* More specifically, *the rate of interest is the ratio found by dividing the rate of flow of a uniform perpetual stream of income measured in terms of money by the capital which such a stream is worth also measured in terms of money.* Business men sometimes call the rate of interest the "price of capital" or the "price of ready money." Suppose, for instance, that any capital worth $10,000 to-day will secure a perpetual annual income worth $400 per year; then the rate of interest is said to be 4 per cent.

It will be observed that the preceding definition of interest involves the idea of *perpetual* income. Another defini-

tion may be found without involving that idea. The rate of interest may be defined as the *premium* on money in hand at one date in terms of money to be in hand one year later. Present and future money never exchange at par. One hundred dollars to-day is always worth more than $100 due one year hence. If, then, $100 to-day will exchange for $104 one year hence, the *premium* — or rate of interest — is 4 per cent. That is, the price of to-day's money in next year's money is 4 per cent above par; for 104/100 exceeds 100/100 by 4/100.

We have, then, two definitions of the rate of interest, viz. "the price of capital in terms of income" and "the premium on present money over money due *one* year hence."

But the two definitions are quite consistent, and either may be converted into the other. The rates of interest in the two senses are, in fact, equal, unless one of them be supposed to change from year to year. For instance, if a man borrows $100 to-day and agrees to pay it back in *one year* with interest at 4 per cent, we may conceive of him as selling a perpetual income of $4 a year for $100 — that is, giving 4 per cent interest in the "price" sense — and *at the same time* agreeing to buy it back for $100 at the end of one year. But these two stipulations — to sell and to buy back — amount simply to an exchange of $100 to-day for $104 next year — that is, an exchange at 4 per cent interest in the "premium" sense. Hereafter, therefore, we shall not attempt to distinguish between the two definitions of the rate of interest.

By means of the rate of interest we can evidently *translate*, as it were, present money value into equivalent future money value, or future money value into its equivalent present money value. Thus, if we know that the rate of interest is 4 per cent, we can find how much $1000 to-day is worth next year or the year after and also how much $1000 due next year or the year after is worth to-day. To translate

any present value into next year's value, we multiply by the factor 1.04; to translate any next year's value into this year's value, we divide by this factor 1.04. This operation is what we learned in our school arithmetics as "discounting." The rate of interest is thus a *link* between any two points of time — a link by means of which we may compare values at any different dates.

The rate of interest, however defined, is a species of price, but a very different species from any prices mentioned in previous chapters. We have seen that the price of wheat enabled us to translate any given number of bushels of wheat into so many dollars' worth of wheat, and the prices of other goods, to translate, in like manner, their respective quantities into their money equivalents. Any price thus serves as a bridge or link between the quantity of any good and its value.

By means of prices we could convert a miscellaneous assortment of goods at any time into their money value *for that same time* or convert a miscellaneous assortment of benefits occurring through a period of time into their money value *for that same period*. By such prices we may only convert quantities into *simultaneous* money values. We cannot pass from one time to another. By means, however, of that unique price called the rate of interest, we may convert the money values found for one time into their eqiuvalent at another time. The rate of interest is thus the hitherto missing link necessary for reckoning money equivalence universally.

We are not yet ready to explain how the rate of interest comes about. In fact, we are not yet ready to explain how any prices come about. We must, for the present, take the rate of interest ready-made just as we have taken other prices ready-made. In the preceding chapters we have seen how to form capital accounts and income accounts by assuming the prices necessary in each case to turn quantities into money values. We are now ready to show the rela-

tions between these two sets of accounts by assuming a rate of interest to turn income into capital. It is worth while, however, at the outset to rid our minds of the idea that money is the one and only source of interest, just as we have already rid our minds of the idea that all wealth is money. We may, as we have seen, express a great many things in terms of money value which are not themselves money. This habit leads us unconsciously into the fallacy of thinking of these things as though they were actual money. If we question a man who says "I have $10,000 of money invested, and from it I get $500 of money each year as interest," implying a rate of interest of 5 per cent, he will be forced to admit that he hasn't really got $10,000 of money at all, and perhaps even that the $500 of money interest which he says he gets each year is not at first in money form. He may then attempt to correct his statement by substituting the following: "I have put my $10,000 of money into a farm, and each year I get $500 by selling the crops." This form of statement brings to light two other things than money, viz. a farm and its crops. But even this form is in error, for it still seems to imply that there is somewhere some money ($10,000) in the farm, and that this money in the farm yields some other money ($500) each year. The true form of statement is simply that the man has a farm which yields crops, and that both of these are worth, or their value may be measured in terms of, money, the farm being worth $10,000 and the crop $500. Money need not enter at all except as a matter of bookkeeping. Hence, if we are careful, we will avoid thinking and speaking of a fund of $10,000 producing an interest of $500, but will instead think and speak of actual *capital*, such as farms, factories, railways, or ships worth $10,000 producing actual benefits (such as yielding crops, manufacturing cloth, or transporting goods) which benefits are worth $500.

There is another confusion to be carefully avoided, viz. the confusion between interest and the *rate* of interest. If

the *interest* from $10,000 worth of capital is $500 worth of benefits, the interest is this $500 worth of benefits, but the *rate* of interest is 5 per cent. Interest and the rate of interest are as distinct as value and price and in the same way.

The rate of interest, then, is a sort of universal time price representing the terms on which men consider this year's values exchangeable in next year's or future years' values. By assuming this rate, we are enabled to convert future values into present or present into future.

§ 2. Capital as Discounted Income

But although the rate of interest may be used either for computing from present to future values, or from future to present values, the latter process is far the more important of the two. Accountants, of course, are constantly computing in both directions, for they have both sets of problems to deal with, but the problem of time valuation which nature sets us is that of translating the future into the present; that is, the problem of ascertaining the value of capital. The value of capital *must* be computed from the value of its expected future income. We cannot proceed in the opposite direction and derive the value of future income from the value of present capital.

This statement may at first puzzle the student; for he may have thought of income as derived from capital. And this is true. *Income* in its original state is derived from capital in its original state. But the *value* of income is not derived from the *value* of capital. On the contrary, the value of the capital is derived from the value of the income. For not until we know how much income an item of capital will bring us can we set any valuation on that capital at all. The wheat crop depends on the land which yields it. But the value of the crop does not depend on the value of the land. On the contrary, the value of the land depends on the value of its crop.

The present worth of anything is what men are willing to give for it. In order that each man may decide what he is willing to give, he must have two bits of data: (1) some idea of the value of the future benefits his purchase will bring him, and (2) some idea of the rate of interest by which these future values may be translated into present values.

With these data he may derive the value of any capital from the value of its income by means of the connecting link between them called the rate of interest. This derivation of capital-value from income-value is called " capitalizing," or, more generally, " discounting," income.

§ 3. The Discount Curve

Let us assume that the expected income is foreknown with certainty, and that the rate of interest is also known. With these provisos, when we know the income that will be yielded by any article of wealth or item of property, it is very easy, by the use of the rate of interest, to compute the capital-value of said wealth or property; and this, whether the income accrues continuously or discontinuously; whether it is uniform or fluctuating; whether the installments of it are few or infinite in number.

We begin by considering the simplest case, namely, that in which the future income consists of a single item accruing at a definite instant of time. If, for instance, one holds a property right by virtue of which he will receive at the end of one year a benefit worth $104, the present value of this right, *if the rate of interest is* 4 *per cent*, will be $100. Or if, by virtue of the property, he is to receive a benefit worth $1 one year hence, its present value (interest being at 4 per cent) is found, as we have seen, by dividing the $1 by the factor 1.04. The result is $1 / 1.04 or $0.962; if the value to which the right entitles the owner is any other amount than $1, its present value is simply that other amount divided

by 1.04. Thus the present value of $432 due in one year is $432/1.04, which is $415.38.

Conversely, $1 to-day is the present value of $1.04 a year hence; and $1.04 a year hence will *then* be the present value of $1.082 two years hence. This is by compound interest. The $1.04 due at the end of the first year, when multiplied by the factor 1.04, gives $1.082 as its equivalent at the end of the second year. The $1.082 is therefore the equivalent of, and is called the " amount " of $1 at the end of two years, just as $1.04 is the " amount " of $1 in one year. Thus $1 in the hand to-day is worth $1.082 in the bush two years hence and, since the same ratio applies to all other sums, if we know the value of any sum two years hence, but not its present value, we may find the latter by simple proportion. Thus let $1 be the future value two years hence of a present unknown sum x. Then we have the following proportion: as this present sum x is to its future amount $1, so is the present sum $1 to *its* future amount $1.082. Solving the proportion, we find that x is $.924, which therefore is the present value of $1 due two years hence. The same principles apply to three or more years.

We may illustrate this process by a diagram, much in the same way as geography is illustrated by a map. In Figure 2 is a curve, A, A′, A″, A‴, etc. The latitudes of these points, or their vertical distances above the base line, represent the values of capital as determined at given instants of time, and the longitudes or horizontal distances between them represent the intervals of time between those instants. Thus, let the point B represent the present instant, and let the longitude interval, BB' represent a year. Using the same intervals for successive years, we have AB representing any present capital, say $1, $A'B'$ representing its equivalent next year, say $1.04, $A''B''$, the equivalent two years hence, and so on. We see that $A'B'$ is what we have called the " amount " of AB put out at interest for one year, and $A''B''$ is the " amount " of the same, compounded for two

years. Conversely, AB represents the present value or discounted value of any one altitude on the curve, say $A'B'$, as well as of any other such as $A''B''$ or $A'''B'''$. The latitude of any point on the curve may thus be regarded either as the "amount" of the sum represented by any preceding latitude or as the "present value" of the sum represented by any succeeding latitude. Thus, if the total breadth of the diagram $BB^{(t)}$ is any length of time, say t years, we may either say that $A^{(t)}B^{(t)}$ is the future

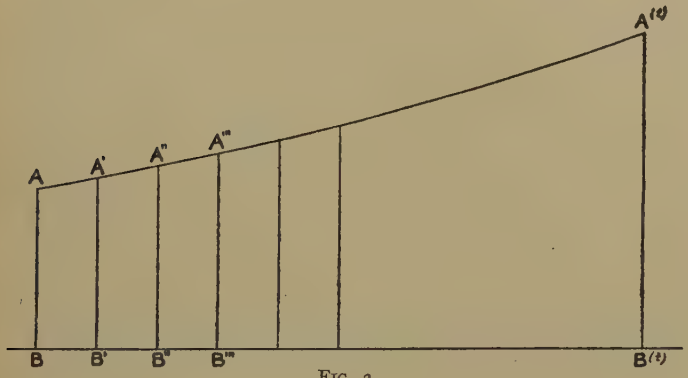


FIG. 2.

"amount" of the present AB, or that the present AB is the "present value" of the future sum, $A^{(t)}B^{(t)}$. The line $AA^{(t)}$ not only ascends but at an accelerating rate — *i.e.* it does not ascend in a straight line, but gradually bends upward, forming a curve which in economics is called the "discount curve." This curve, if prolonged to the left, will, of course, never reach the bottom line. It keeps becoming flatter and flatter so that its distance above the line can never become zero.

Curves sometimes puzzle beginners, but they are very important in economics, and make the subjects which they illustrate so clear and simple that the student should not fail to make himself master of their use at the outset.

The discount curve is a tool by which we can interpret the relations between income and capital.

§ 4. Application to valuing Instruments and Property

The principles which have been explained for obtaining the present value of a single future sum apply to many commercial transactions, such as to the valuation of bank assets, which exist largely in the form of "discount paper," or short-time loans of other kinds. The value of such a note is always the discounted value of the future payment to which it entitles the holder. Similarly, the value of any article of wealth, reckoned when that wealth is in course of construction, is the present value of what it will bring when completed, less the present value of the cost of completion. For instance, the maker of an automobile will, at any of its stages in the course of construction, appraise it as worth the discounted value of its probable price when finished and sold, less the discounted value of the costs of construction and selling which still remain. The element of risk should not, of course, be overlooked; but its consideration does not belong here.

Another application of these principles of capitalization is to goods in transit. A cargo leaving Sydney for Liverpool is worth the discounted value of what it will fetch in Liverpool, less the discounted value of the cost of carrying it there. Other classical examples are wine, the value of which is the present worth of what it will be when "mellow" and ready for consumption; and young forests, which are worth the discounted value of the lumber they will ultimately form.

Ordinarily, however, we have to deal not with one future sum but with a series of future sums. A man who buys a bond or a share of stock is really buying the right to a series of future items of income. But we can treat a series of items of income by discount curves in exactly the same way

that we can treat one such item. This fact is shown in Figure 3. Suppose that *a* represents the present point of time, and *A* the point of time in the future at which the last benefit occurs. The diagram refers to any instrument of capital, such as a house, or any property right, such as a bond. In either case the capital every season yields so many dollars' worth of benefits or income. This income is represented by the short, *heavy* vertical lines drawn on the verticals. In the particular case here represented we have three stages. The capital yields about the same amount during each year of the first stage of four years. After that the

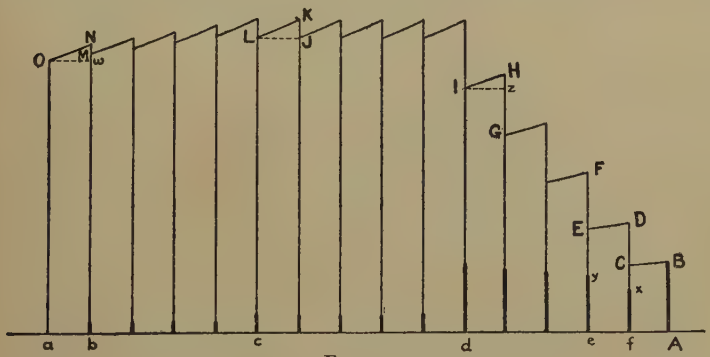


FIG. 3.

yearly income is greater during a second period of five years; during the third and last period, of six years, it is still greater. The first period of income is represented by short, heavy vertical lines drawn upward from the base; the second by lines slightly longer, and the third by lines still longer. We thus have a series of fifteen heavy verticals representing the successive items of income for fifteen years. Our problem is, on the basis of this series of fifteen lines *representing income,* to construct a curve *representing the value of the capital.* This curve is *AO,* and must be constructed *backward* from *A* to *O.* The value of this house or bond just before it is worn out or paid up is evidently about equal

to the value of the income, then about to be had from the capital, represented by the last vertical, *AB*, to the right. A year earlier than this the capital will be worth the discounted value of *AB* as represented in the height *f*C of the discount curve (drawn backward one year from *B*). This is the value just *after* the item of income *fx* has been detached. Its value just *before fx* was detached was, of course, greater by *fx*. This greater value is *fD*, the difference, *CD*, being equal to the benefit *fx*. Proceeding another year back, the value of the capital just *after* the income at that time is taken out, is *eE*, and just *before* that income is taken out, it is *eF*. In this way we may proceed backward year by year. Each tooth in this broken curve will have a height equal to the value of the benefits of the capital in the year at the beginning of which it stands. We thus construct a broken line or "curve," beginning at the farthest future point and working backward to the present. This curve represents the value of the capital at the various points of time prior to its wearing out. This curve goes up and down. It goes down *suddenly*, whenever a benefit is detached, and it goes up *gradually*, while remaining future benefits are anticipated and approaching.

In this curve we have a picture of the history of the value of the capital it illustrates. We formed this curve backward. But now that it is formed, let us follow it forward. It begins with *O*, rises gradually until the first of its periodic benefits is realized, such as receiving a rent payment, a crop, or a coupon. When, let us say, a coupon is cut, the curve falls by the amount of that coupon. Each coupon cut off is represented by the heavy vertical line at the base; the fall in the value of the capital, being exactly equal, is represented by the tooth immediately over said heavy vertical line. During the ensuing year the capital value gradually climbs up as the next coupon cutting approaches, when it again falls by the amount of that coupon; and so on, always rising up in virtue of *anticipation* of future income

and falling after each *realization*. Finally, when the last coupon is taken out, the value of the capital vanishes altogether. The value of the capital fluctuates then, by a series of teeth.

§ 5. Valuing a Bond

Let us now apply these principles to the special case of valuing an ordinary bond, entitling the holder to a series of equal items of income and also to a larger single sum at the end. A so-called " 5 per cent, ten-year, $100 bond " means the right to receive an annuity of $5 a year for ten years, and in addition, $100 at the end of the ten years, called the " principal."

If the rate of interest is 5 per cent, and a man buys a bond which entitles him to an annual income of $5 a year for ten years and $100 returnable at the end of this period, it is evident that the purchase price of the bond must be $100 or " par." In this case the $5 of annual income is the interest on the purchase price, and the sum of $100 which is to be received at maturity is equal to the sum originally invested. Such a bond is called a 5 per cent bond, the annual installments of income are called " interest," and the final payment of $100 is called " principal."

The value of a bond may, of course, be obtained by means of discount curves on precisely the same principles as were explained in relation to Figure 3. The only difference is in the size of the various installments of income represented by the original dark verticals from which the remainder of the diagram is derived. Figure 4 represents the value-history of a ten-year 5 per cent bond when the rate of interest is 5 per cent.

We see that, at the beginning, the value of the bond is $100 or par (represented by AB); and that it gradually increases in value to $105 ($A'B'$) at the end of the year, when it suddenly falls again to $100 ($A''B'$) in consequence of the detachment of the first installment of $5. During the

next year it repeats the same cycle, and so on for each year until the ten years are up, when its value disappears to zero with the payment of the principal.

But often the bond is not sold at par. If the bond is sold above par, say at $108, the rate of interest realized by the investor is not 5 per cent at all, but only 4 per cent.

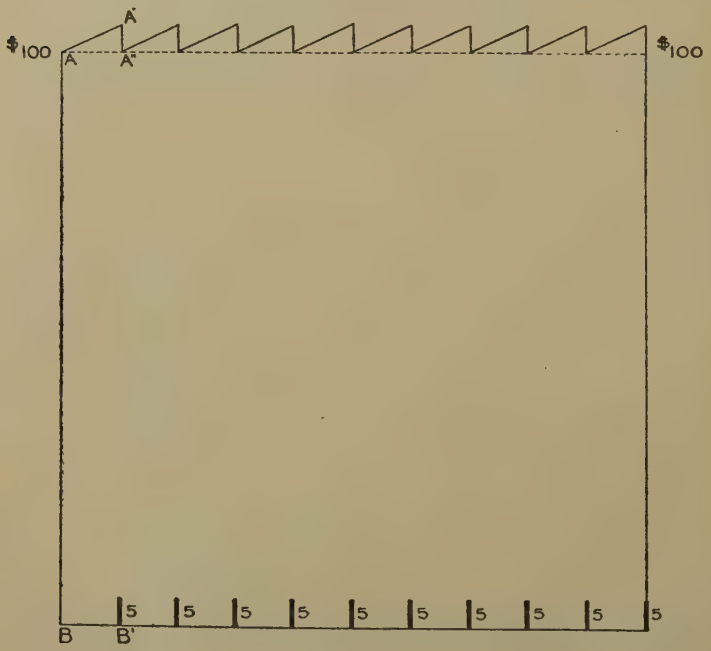


FIG. 4.

In this case the bond is only nominally a " 5 per cent bond." The *true* rate of interest is that rate of interest which, if used for discounting all the benefits — the 10 annual items of $5 each and the final item of $100 — will give the value *at which the bond was actually bought*, above or below par, as the case may be. Let this true rate of interest be 4 per cent. The 5 per cent bond is then said to be sold on a 4

per cent basis. The investor does not make 5 per cent, as he would, had he bought the bond at $100, but makes only 4 per cent because he bought at $108.

This capital-value ($108) of a so-called 5 per cent bond, sold or valued on a 4 per cent basis, is obtained by reckon-

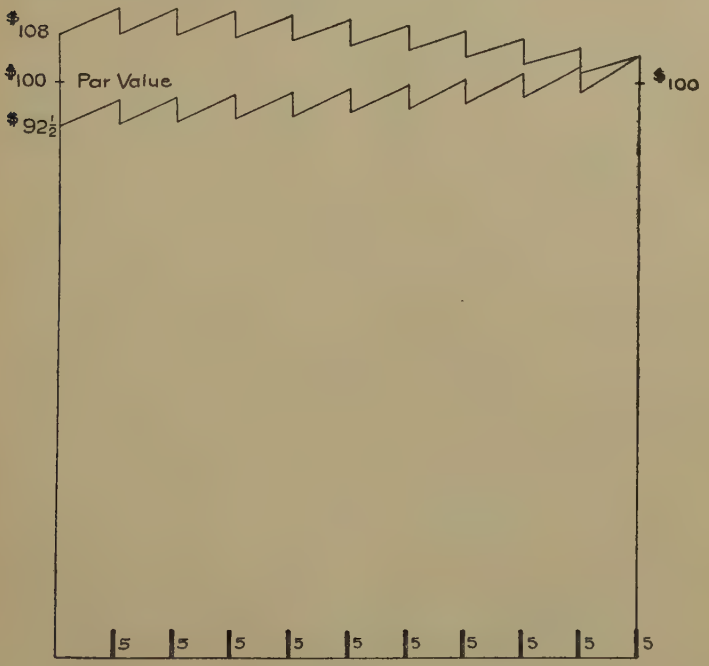


FIG. 5.

ing at 4 per cent the present values of the ten payments of $5 each and the present value of the final payment of $100, and adding these all together.

In Figure 5 the upper line shows the value-history of the 5 per cent bond sold on a 4 per cent basis, beginning with $108 and, after the usual series of gradual rises and sudden falls, reaching par at the end of ten years and then dropping to zero. The difference between this curve and that in Figure

4 consists in the fact that the discount curves are all less steep in the upper curve of Figure 5 than the discount curves in Figure 4, and is due to the fact that the rate of interest is now supposed to be only 4 per cent instead of 5 per cent. If interest is 6 per cent, we shall have the lower of the two curves in Figure 5, made up of discount curves, *steeper* than those of Figure 4. This curve shows that the bond then begins at $93, reaching $100 or par in the ten years, and then drops to zero.

It is worth noting that the final $105, although $100 of it is called "principal," is really just as truly income from the bond as all the items called "interest." The original investment is the real discounted value of *all* the expected receipts; the final "returned" principal is simply a part of the largest of those receipts. The only difference between this receipt and the other smaller ones is that usually it is employed differently when received. It is usually "reinvested," that is, exchanged for other long-time securities, whereas the smaller items of income, the so-called "interest," are usually "spent," *i.e.* exchanged for articles of shorter duration, and thereby soon converted into true "final income" or satisfactions. The "principal" and "interest," therefore, while both are income *with reference to the bond considered by itself*, are apt to lead to different results when followed into the final transformations of purchase and sale which ensue. The principal, though income from the bond, is outgo for the new investment. The owner is thus virtually in possession of a perpetual series of payments of $5 a year. It is with a view to such an operation that the final payment of $100 on a bond is instinctively regarded as on a different footing from the other payments called "interest." It is called "principal," on the theory that it is to be reinvested in order to continue the perpetual income of $5. In theory, therefore, it represents capital, whereas the other payments represent only income. But we see now that both are income received from the bond as a source of

income, although either may, by reinvestment, be put into capital. That one of them is usually put back into capital, and the other not, is a matter of subsequent history, and does not affect the study of the present value of the bond itself.

Elaborate tables have been constructed, called "bond-value books," calculated on the foregoing principles. They are used by brokers for indicating the true value of bonds on different bases. They are also used for solving the converse problem, viz. for finding the true rate of interest "realized" when a bond is bought at a given price. The following is an abridgment of these tables, for (so-called) 3 per cent, 4 per cent, and 5 per cent bonds. The prices of the bonds in all cases are the prices immediately *after* an installment of income.

Rates of Interest

"Three Per Cent Bond"

Price	Years to Maturity							
	1	2	3	5	10	20	30	50
120						1.8	2.1	2.3
110					1.9	2.4	2.5	2.6
105			1.3	2.0	2.4	2.7	2.8	2.8
103		1.5	2.0	2.4	2.7	2.8	2.9	2.9
102		2.0	2.3	2.6	2.8	2.9	2.9	2.9
101	2.0	2.5	2.7	2.8	2.9	2.9	2.9	3.0
100	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
99	4.0	3.5	3.4	3.2	3.1	3.1	3.1	3.0
98	5.1	4.1	3.7	3.4	3.2	3.1	3.1	3.1
97	6.1	4.6	4.1	3.7	3.4	3.2	3.2	3.1
95	8.3	5.7	4.8	4.1	3.6	3.3	3.3	3.2
90		8.6	6.7	5.3	4.2	3.7	3.6	3.4
80				7.9	5.7	4.5	4.2	3.9
70					7.3	5.5	4.9	4.5

Rates of Interest

"Four Per Cent Bond"

Price	Years to Maturity							
	1	2	3	5	10	20	30	50
130						2.2	2.6	2.9
120					1.8	2.7	3.0	3.2
110				1.9	2.8	3.3	3.5	3.6
105		1.5	2.3	2.9	3.4	3.7	3.7	3.8
103		2.5	3.0	3.3	3.6	3.8	3.8	3.9
102	2.0	3.0	3.3	3.6	3.8	3.9	3.9	3.9
101	3.0	3.5	3.6	3.8	3.9	3.9	3.9	4.0
100	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
99	5.0	4.5	4.4	4.2	4.1	4.1	4.1	4.1
98	6.1	5.1	4.7	4.5	4.3	4.2	4.1	4.1
97	7.2	5.6	5.1	4.7	4.4	4.2	4.2	4.1
95	9.4	6.7	5.8	5.2	4.6	4.4	4.3	4.2
90		9.6	7.8	6.4	5.3	4.8	4.6	4.5
80				9.1	6.8	5.7	5.6	5.1

Rates of Interest

"Five Per Cent Bond"

Price	Years to Maturity							
	1	2	3	5	10	20	30	50
140						2.5	3.0	3.4
130					1.7	3.0	3.4	3.7
120					2.7	3.6	3.9	4.1
110			1.6	2.8	3.8	4.3	4.4	4.5
105		2.4	3.2	3.9	4.4	4.6	4.7	4.7
103	2.0	3.4	3.9	4.3	4.6	4.8	4.8	4.8
102	3.0	4.0	4.3	4.6	4.8	4.8	4.9	4.9
101	4.0	4.5	4.6	4.8	4.9	4.9	4.9	5.0
100	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
99	6.1	5.5	5.4	5.2	5.1	5.1	5.1	5.1
98	7.1	6.1	5.7	5.5	5.3	5.2	5.1	5.1
97	8.2	6.6	6.1	5.7	5.4	5.2	5.2	5.2
95		7.7	6.9	6.2	5.7	5.4	5.3	5.3
90			8.9	7.4	6.4	5.9	5.7	5.6
80					7.9	6.9	6.5	6.3

§ 6. Capital-value when Alternative Income Streams are Possible

Thus far we have considered the possibility of but *one* income stream from any given capital. But it often happens that, from the same instrument, there is a choice between several different income streams. Land may be used for grazing, agriculture, building, or recreation. Tools may be employed in a variety of ways, and the same is true of innumerable articles of wealth, particularly when taken in combination. What, then, determines the value of the capital? It is obviously not the sum of the discounted values of the different income streams, but the discounted value of that one which is chosen in preference to all the others. What, then, determines the choice of the series of uses to which any given instrument may be put? Evidently that particular series of uses will be selected which yields the maximum present value. Thus, if land used for grazing purposes will yield a net service of $1000 a year forever, and interest is taken at 4 per cent, its value for grazing purposes is evidently $25,000. If, in like manner, the capital-value for some other use, say, for growing wheat, is $20,000, it is clear that the land will be employed for grazing rather than for growing wheat, and will derive its value from the grazing use and not from the wheat use.

We conclude, therefore, that the value of any capital-good, either of wealth or of property rights, assuming that all future income is foreknown, is the discounted value of the income chosen.

§ 7. Effect of changing the Rate of Interest

If the rate of interest is changed, the value of all capital will be changed in the opposite direction. The amount of change, however, will be very different with different ar-

ticles of capital. Thus, let us suppose five typical articles as given in the following table: —

Capital	Net Income per Year	Total	Capital Value (Int. at 5%)	Capital Value (Int. at 2½%)
Land	$1000 per yr. forever	Infinite	$20,000.00	$40,000.00
House	$1000 per yr. for 50 yr.	$50,000.00	18,300.00	28,400.00
Horse	$100 per yr. for 6 yr.	600.00	508.00	551.00
Suit of clothes	$20 1st yr.; $10 2d yr.	30.00	28.00	29.00
Loaf of bread	$36.50 per yr., for 1 day	.10	.10	.10

If the value of the benefits derivable from these various articles continues the same, but the rate of interest is suddenly cut down from 5 per cent to 2½ per cent, there will result a general increase in the capital-values, but a very different increase for different articles. The more enduring ones will be affected the most. These effects are seen in the last column of the table. When the rate of interest is halved, the value of the land will be doubled, rising from $20,000 to $40,000, but the value of the house will rise by only about 60 per cent, *i.e.* from $18,300 to $28,400; the value of the horse will rise only 10 per cent, *i.e.* from $508 to $551; the value of the suit will rise only from $28 to $29; and, finally, the value of the loaf of bread will not rise at all, but will remain at 10 cents. We see in these five types of articles that the sensitiveness of capital-value to a change in the rate of interest is the greater, the more enduring the income.

CHAPTER VII

VARIATIONS OF INCOME IN RELATION TO CAPITAL

§ 1. Realized and Standard Income

We have seen how the value of capital is derived from that of income. We have also seen that the value of capital rises in anticipation of income and falls with its realization, and that the alternate rise and fall may or may not be equal. If the income taken out is just equal to the appreciation of the capital, the capital is thereby restored to its original value. If more than this amount of income be taken out, the capital will be impaired; if less, the capital will accumulate.

When the income taken out is such that the capital left is neither impaired nor increased, that income is called *standard* income, because it affords a convenient standard with which to compare other incomes. Thus, $50 a year is the standard income from capital worth $1000 when the rate of interest is 5 per cent; for, since such a capital will increase or appreciate $50 in the course of a year, and since just the amount of this appreciation is taken out, the capital will be left at the beginning of the next year at just the figure of the year before, $1000. The standard income on any capital is the *interest* on that capital; that is, it is the income which will keep the capital value intact.

But the owner of a capital of $1000 may take from it each year either more or less than the standard amount, $50. The $1000 merely means the present value, discounted at 5 per cent, of *some* income stream; but this income stream may take any one of an indefinite number of forms. It *may*

take the standard form of a perpetual annual income of $50 a year; but it may also take the form of an income which is twice the standard, or $100 a year for 14 years, and which then ceases altogether; for the discounted value of these 14 sums is $1000. Or it may take the form of an income which is half the standard, or $25 a year for the first 10 years, is then $167.50 a year for 10 years, and which then ceases; for, discounted at 5 per cent, *this* income also will give a capital of $1000.

There are, then, two kinds of income: first, the so-called *standard* income, just described; second, "realized" income. Realized income is whatever income is actually realized — that is, detached from the capital — in any given case. Standard income and realized income may, of course, sometimes be equal.

Of all possible forms of income, then, we take the perpetuity as the *standard* and compare the others with it. For instance, the possessor of a property yielding $100 *a year for 14 years* knows that he might sell this property for $1000 and reinvest in another property yielding the standard $50 *a year forever*. Contrasting this standard income of $50 a year forever which he *might* receive, with the income of $100 a year for 14 years which he *does* receive, he finds that his income exceeds the standard income, so long as it lasts, by $50 a year. This excess of $50 each year involves, however, *a reduction of* $50 *each year in the capital-value of his property*. At the end of the first year the value of his property will be the discounted value of $100 a year for thirteen (instead of fourteen) years, which, if interest is still reckoned at 5 per cent, is $950.

The principle is perfectly general, and may be summarized as follows: (1) When a property yields a specified foreknown income, and is valued by discounting that income according to a specified rate of interest, if the realized income is equal to the standard income, the value of the capital will remain at a uniform level. (2) If realized income exceeds standard

income, the value of the capital will be decreased by the amount of the excess. (3) If realized income is less than standard income, the value of the capital will be increased by the deficiency.

Expressed in a single sentence, the general principle connecting realized and standard income is that *they differ by the appreciation or depreciation of capital.* It is thus possible to describe standard income as realized income less depreciation of capital, or else as realized income plus appreciation of capital.

§ 2. Illustrations

In order that these important relations may be as clear and vivid as possible, we shall illustrate them graphically, by concrete examples, and by business accounting.

In Figure 3 we saw that the value of the capital at first increased each year, then remained stationary, and finally decreased. During the first period, therefore, the realized income was less than the standard income; during the second period it was equal, and during the third greater. Let us look closely at a typical year in each period. During the first year the capital-value first ascended gradually from O to N and then dropped suddenly to M. Its whole ascent, or the appreciation of the capital, was the difference in level of these two points or wN. Had this amount been detached at the end of the year, the capital would have been brought back to its original level and the income would have been standard. But the diagram shows that only NM was actually taken out. In other words, the *realized* income (NM) was less than the *standard* income (Nw) by an amount (Mw) which represents the net increase, appreciation, or savings of capital-value. During the second year, likewise, less income is taken out than the year's total increase in capital-value, leaving a net increase of capital-value. After a few years, however, the situation changes. From L

the curve rises to K by an amount KJ, and the coupon cut out (KJ) is in this case just equal to the appreciation; that is, the *realized* income is equal to the *standard* income, and capital is restored to its value at the beginning of the year. In the third case the curve goes up from I to H, appreciating by the amount Hz, but the income HG taken out is in this case greater. The realized income exceeds the standard, and capital is impaired by the difference (Gz).

To illustrate by concrete examples the distinction between standard and realized income, we use the following six typical cases.

Capital	Realized Income per Year	Capital Value (Int. at 5%)	Standard Income for First Year	Rate of Realized Value return First Year	Rate of Standard Value return
Forest land	$1000 a yr. for 14 yrs. and then $3000 a yr. forever	$40,000.00	$2000.00	% 2.5	% 5
Farm land	$1000 per yr. forever	$20,000.00	$1000.00	5	5
House	$1000 per yr. for 50 yrs. . . .	18,300.00	915.00	5.4	5
Horse	$100 per yr. for 6 yrs.	508.00	25.40	19.6	5
Suit of clothes	$20 1st yr.; $10 2d yr.	28.00	1.40	71.4	5
Loaf of bread	$36.50 per yr. for 1 day	.10	.00	36,500	5

1. *The forest land* yields $1000 the first year on a capital-value of $40,000, from which, on the 5 per cent basis assumed, the standard income would be 5 per cent of $40,000 or $2000. Consequently, the *realized* income ($1000) is less than the *standard* income ($2000) by $1000. Therefore the forest will appreciate in the year by the excess, $2000 − $1000 or $1000, and will be worth $41,000 at the end of the year. It will continue to appreciate for 14 years, after which it will be

worth $60,000, after which its realized income ($3000) will be equal to the standard income.

2. *The farm land* yielding $1000 a year in perpetuity is worth $20,000, and continues to be worth that amount each succeeding year. The realized income of $1000 is always the *standard* income from $20,000.

3. *The house* yields a realized income of $1000 on a capital-value the first year of only $18,300. The *standard* income from $18,300 would be only 5 per cent of 18,300 or $915. The consequence is an excess of realized over standard income of $1000 − $915 or $85, and a corresponding fall of $85 in the value of the capital. That is, the house depreciates by $85 in the year, or from $18,300 to $18,215. It will continue to depreciate each year until its value vanishes entirely at the end of 50 years.

4. *The horse* also depreciates, and very fast. Its owner realized from the horse an income of $100 on a capital-value of $508, from which the standard income would be only $25.40. The difference between the realized and standard income is $100 − $25.40 or $74.60, and the horse will lose that much in value in the year.

5. *The suit of clothes* yields an income the first year of $20 on a capital of $28, from which the standard income would be only $1.40. It therefore depreciates by the difference, $20 − 1.40 or $18.60.

6. *The loaf of bread* yields for one day only *at the rate* of $36.50 a year or 10 cents a day on a capital-value of 10 cents, the standard income of which amounts to practically zero. Consequently, the loaf depreciates in a day by the difference between 10 cents and zero or 10 cents; that is, loses its value entirely.

In all cases the standard income is 5 per cent of the capital-value, while the realized income may be a higher or a lower percentage. Expressed in percentages, the actual rate of value return (*i.e.* ratio of realized income to capital) on the forest land is 2.5 per cent; on the farm land, 5 per cent;

house, 5.4 per cent; horse, 19.6 per cent; clothes, 71.4 per cent; and bread, 36,500 per cent. The more rapidly the income is taken out the greater the rate of value return realized, but (if that rate exceeds the rate of interest) the more rapidly will the capital be exhausted. The house yields a rate but slightly higher than the rate of interest, and lasts 50 years; the horse yields a rate nearly 4 times the rate of interest, but it lasts only 6 years; the clothes yield a rate over 14 times the rate of interest, but last only 2 years, while the bread yields a rate almost inconceivably great, but lasts only a day. The farm land which yields a rate exactly equal to the rate of interest lasts forever, while the forest land, which yields a rate only half the rate of interest, not only lasts forever, but (so long as the realized rate of value return remains less than the rate of interest) also increases in value.

The various cases supposed may also be illustrated by the dividends declared by a joint stock company. If a company declares dividends of 5 per cent (on the true value of its capital reckoned on a 5 per cent basis), these dividends will be standard income of the capital because they will leave it intact. If the dividends are less than 5 per cent, capital will be accumulated; *i.e.* a "surplus" will be added to the original capital. If the dividends are greater than 5 per cent, the capital or surplus previously accumulated will be decreased. In the last-named case the company is said to pay its dividends partly "out of capital." Such a practice is unusual, and when it occurs is generally with intention to deceive as to the ability to pay dividends. It is, however, not always of such a character. Some land-selling companies in the West distribute dividends far above the standard, every one understanding that, by the nature of the business, the assets are to diminish with each sale. The same is true to some extent of mining companies. The dividends are big, but they are not supposed to keep on forever.

A case at the opposite extreme occurs when the dividends

are made unusually small in order that the capital may be increased. There is in New York City a company which has never declared any dividends, but has been rolling up a large surplus for years, and whose stock is for this reason much above par.

We have already seen that every item in an income account represents the income or outgo from some item in the capital account. That is, the income account consists merely in a statement of the income and outgo from each item of asset or liability, including that class of assets and liabilities which are alike claims and obligations, such as leases and employees' contracts. If the income for each item remains steady or standard, the relation between the capital and income accounts is very simple. In such a case (supposing the rate of interest to be 5 per cent), eachitem in the capital account will constantly stand at twenty times the amount of the corresponding item in the income account.

Rightly interpreted, the capital account merely represents as a whole the *capitalization of expected items in the income account;* and the fluctuations of the capital account correspond with the *deviations from the standard income in the items of the income account.*

§ 3. Confusions to be Avoided

With all the preceding explanations and illustrations the distinction between realized and standard income should be clear. Standard income is the income which ought to be taken out in order to maintain capital intact, neither impaired nor increased. Realized income is the income which really is taken out. The one income is only an ideal, the other, real. The realized is equal to the actual drop in the curve of Figure 3 ; the standard is what that drop would need to be in order to equal the previous gradual rise.

Of these two concepts, realized income is by far the more fundamental. Everything else grows out of realized income

— the value of the capital and therefore the value of the interest upon that capital, which is the standard income, as we have seen. We cannot, as would at first seem possible, begin with capital-value and derive the actual income from it; nor can we begin with standard income, for standard income *presupposes* some capital-value for which it is standard. That is, *standard* income depends on capital-value, and *capital-value* depends on *realized* income. The order of dependence then is realized income, capital-value, standard income. All three of these concepts must be carefully distinguished. It is not uncommon to confuse them. The illustrative table will help to keep us from confusing them. For instance, from this table we see clearly one reason why certain articles have been erroneously identified with income. Bread has practically the same capital-value as income-value, so that, if a person were not accustomed to fine distinctions, he might think it unnecessary to discriminate between the 10 cents which is the value of the *use* of the bread, and which is, therefore, *income*, and the 10 cents which is the value of the bread itself, and which is, therefore, capital. There is almost as much danger of such confusion in the case of clothing; for there is only a slight difference between the $30 which is the value of the use of the suit, and is therefore income, and the $28 which is the value of the suit, and is therefore capital. As we pass to the more enduring articles, there emerges so wide a difference between the value of the use of an instrument and the value of the instrument itself, that there is no difficulty in distinguishing between them. *But if the distinction is valid in one case, it is valid in the others.* We find no difficulty in distinguishing between the shelter of a house, which is income, and the house itself, which is capital; nor between their values. Thus the shelter is worth $1000 a year for 50 years (or $50,000 in all), whereas the house itself is the discounted value of all this $50,000, or $18,300. We should find no greater difficulty in distinguishing between the use of the clothes

and the clothes nor between the use of the bread and the bread.

The more rapidly any capital yields up its benefits, *i.e.* the greater the rate at which its realized income is taken out, the more the danger of confusing the capital with the income it yields.

Again, the confusion between realized and standard income is fostered by the very effort of bookkeepers to make the two identical. To do so may be said to be the bookkeeper's ideal.

We have shown the tendency to confuse three concepts, — standard income, realized income, and capital-value. We have also dealt with a fourth concept, which must not be confused with the other three, viz. *savings*. Savings in its broadest sense includes more than simply saved money. It includes all the net increase in capital-value after all income has been detached. It is the net appreciation or the difference (*Mw* in Figure 3) between the total appreciation of capital or standard income (*Nw*) and the realized income (*MN*). Savings are therefore still a part of capital. They are the part of capital saved from being taken out for income. They are not a part of realized income. The individual is always struggling between saving more capital and realizing more income. He cannot do both, — have his cake and eat it too. A savings bank depositor is sometimes thought to draw income from his deposit when the interest merely "accumulates" in the bank. This is an error. The bank renders income when, and only when, money is drawn out of it. It occasions outgo when, and only when, money is put into it. If the depositor merely lets his deposit accumulate, he derives no income and suffers no outgo. There is no effect on income. The only effect is upon capital, which is made to increase. If we accept the fiction that the man who allows his savings to accumulate virtually receives the interest, we must, to be consistent, also accept the fiction that he redeposits it and so cancels the receipt. If the teller hands over the interest across the counter, the

depositor's account certainly yields up "income" to him, but if he hands it back, the account occasions "outgo," and the net result is simply a cancellation. This procedure reveals clearly the fact that the accumulation is not income.

We have seen that net appreciation or savings are not income, but additions to capital. Likewise, net depreciation or "wear and tear" are not outgo, but subtractions from capital. Almost every article except land ultimately depreciates in value owing to the fact that the services left for it to render gradually diminish in number and value. The approaching cessation of services may be due to *physical* wear, but not always. Sometimes the expression "wear and tear" is a misnomer. There are articles which suffer no physical change, but of which the services nevertheless last only a limited period. On the Atlantic coast the fishermen sometimes construct temporary platforms which are pretty sure to disappear in the September gales. It is evident that without any physical deterioration the value of such property must nevertheless decrease rapidly as the end of the fishing season approaches. In like manner the "World's Fair" buildings at St. Louis depreciated, during the brief period of the fair, from $15,000,000, which was first paid for their construction, to $386,000, for which they were sold after they had served the purpose for which they were built. The buildings equipping a mine become worthless when the mine is exhausted. "Wear and tear," therefore, is a phrase which we should use only in a metaphorical sense. Even when there is actual physical deterioration, this deterioration acts upon the value only in so far as it decreases or terminates the flow of income, and not simply because of a physical change in the capital which bears the income.

There are then four concepts which we must keep distinct, viz: —

Realized income.

Capital-value (the discounted value of expected realized income).

Standard income (the interest on capital-value).

Savings (the deficiency of realized compared with standard income) ; and its opposite, " wear and tear " (the excess of realized compared with standard income).

These are given in the order of dependence on realized income.

§ 4. Standardizing Income

Various devices have been made to make realized income standard, or, as we may express it, to standardize income. The method of the depreciation fund has already been mentioned under income accounts. By it, an irregular income is converted into a regular income; and we know that the capital-value of a perpetually regular income will remain constant. For instance, the possessor of $18,300 purchases a house and obtains at first an income worth $1000 a year. He knows, however, that by the end of 50 years the house will need to be rebuilt, and therefore sets aside a depreciation fund into which he pays annually a sum equal to the depreciation of his house. This, in the first year, is $85, as we have seen. At the end of 50 years his depreciation fund is large enough to rebuild the house. Although the house *by itself* does not yield him a standard income ($915), but $1000 a year for 50 years, yet *the house and the depreciation fund taken together* yield him the standard $915 in perpetuity, or as long as he keeps up the system.

In this way, any instrument may be made to yield a standard income, not by itself, but conjointly with a depreciation fund. The latter is often forgotten. Only by actually paying into this fund can realized income be standardized. Merely to *reckon* what the depreciation is will not make the income standard. Reckoning depreciation is as poor a substitute for providing a fund to meet depreciation as Beau Brummel's keeping a dinner hour was a substitute for a dinner. Of course, depreciation payments only standardize or change the time-shape of one man's

income at the expense of some other man's income. That is, every addition and subtraction caused in the one man's income implies equal and opposite changes in some other man's. A banker must be found who is willing to take the $85 and succeeding payments and pay back $18,300 at the end of 50 years.

To society as a whole such purely shifting devices are inapplicable, for society can find no outside party on whom to shift the fluctuations. There is, however, a method by which society's income may be more or less standardized; namely, by assorting and combining the various instruments of capital wealth so that the various income streams may be mutually compensatory. For instance, suppose a community owns an iron mine and a young forest. In the iron mine it has a form of property which for a time probably yields more than the standard income. Every bucketful of ore reduces the amount which the mine can yield in the future. After it is exhausted, there will be no further returns. The capital-value of the mine will therefore continue to depreciate. On the other hand, the forest land, which is covered with young saplings, will not begin to yield much income for many years. The income from this capital is therefore temporarily below the standard. A community which owns both mine and timber land will consequently find that the increase and decrease will tend to offset each other, so that its income will be more nearly standard than if it merely possessed either one without the other.

The last-named method may sometimes be applied even to a case of private enterprise; for instance, in the case of capital which consists of a large number of instruments at different stages of production or consumption. If a weaving mill is equipped with 20 looms of the same degree of wear, the value of this plant will evidently diminish, and a depreciation fund may be necessary. But if the 20 looms are evenly distributed throughout the different stages of wear, and if we assume that one loom wears out each year, no deprecia-

tion fund will be necessary. The replacement of one loom annually is equivalent to such a depreciation fund, and the capital is thereby maintained at a constant level.

§ 5. The Risk Element

There is one important feature in the relation between capital-value and income-value which has not yet been mentioned. This is the fact that at any point of time when we take account of capital-value, the future income from which it is discounted is only imperfectly foreknown. The capital-value is the discounted value of the future *expected* income, with all the risks of loss or chances of gain included in present expectations.

Hitherto we have assumed that the entire future history of the capital in question is definitely known in advance; in other words, we have ignored *chance*. The factory which was taken for illustration was supposed to yield definite future income which could be counted upon, precisely as interest on a bond may be counted on by the bondholder. But, as every enterprise offers chances both of gain and loss, we cannot close our discussion of capitalizing income without some account of how these chances affect the matter.

It has been explained that capital-value increases with the approach of an anticipated installment of income, and diminishes as that installment is reached and passed. These changes in capital-value take place when the future income is regarded as certain. The introduction of the element of *chance* will bring other and even more important changes in capital-value. If we take the history of the prices of stocks and bonds, we shall find it to consist chiefly of a record of changing estimates due to what is called chance, rather than of a record of the foreknown approach and detachment of income. Few, if any, future events are entirely free from uncertainty. In fact, property, by its very definition, is simply the right to the *chance* of future benefits. A mine

owner takes his chances as to what the mine will yield; the owner of an orange plantation in Florida takes his risk of winter frosts; the owner of a farm assumes risks as to the effect of sun and rain and other meteorological conditions, as well as risks of the ravages of fire, insects, and pests generally. In buying an overcoat a man takes some risk as to its effectiveness in excluding cold, and as to the length of time it will continue to be serviceable. Even what are called " gilt-edged " securities are not entirely free from risk. Strictly speaking, therefore, every owner of property is a risk taker.

§ 6. Five Methods of avoiding Risk

Business men try not only to estimate the risks which they must encounter and to adjust their accounts accordingly, but they also endeavor to avoid these risks so far as possible, viz.: —

(*a*) By increasing guaranties for the performance of contracts.

(*b*) By increasing safeguards against incurring losses.

(*c*) By increasing foresight and thereby diminishing the risks.

(*d*) By insurance, that is, by consolidating risks.

(*e*) By throwing risks into the hands of a special class of speculators.

These will be considered in order.

(*a*) *The Method of Guaranties.* In spite of the fact that the ownership of capital necessarily involves risk, since the income from it can only be estimated, never precisely foreknown, it is nevertheless possible, by a division of the ownership of capital-wealth, for one class of property holders to assume the burden of risks and to *guarantee* to another class a fixed income. This is the primary reason for the separation of securities into two great classes, called stocks and bonds. In any large enterprise the stockholders take the risks, and by so doing guarantee to the bondholders

a fixed income. As was remarked in a previous chapter, the capital stock acts as a buffer between the liabilities and the assets, which amounts to saying that it guarantees a fixed income to the holders of the various liabilities. President Hadley has emphasized the fact that a bondholder "commutes" the precarious income of an enterprise into a fixed annuity, and that the system by which one class receives "interest" and another "profits" has its origin in the desire of one class to avoid, and the willingness of another to assume, risks.

(*b*) *The Method of Safeguards.* The method of guaranties is really a method of *shifting* risks rather than of avoiding them. The second method — that of safeguards — aims to reduce the risk. Some safeguards are themselves articles of wealth existing simply for the sake of meeting sudden unforeseen emergencies. This is true, for instance, of fire engines, fire extinguishers, safety valves, safety appliances on railways, burglar alarms, safety deposit vaults, etc. To a large extent this risk-meeting function applies to almost every stock or store of wealth. Food in a pantry usually exists beyond *certain* wants in order to provide for *un*certain wants, and when sources of supply are distant, such stores of food need to be large. Especially is this true in the case of armies. Again, a factory will usually have a large reserve stock, both of raw materials and finished products, in order to meet unexpected demands. In like manner, jobbers, wholesalers, and retailers maintain a sufficient stock of goods to meet not only the foreseen, but some of the unforeseen demands of their customers. The function of speculators in grain or other commodities consists largely in conserving the stock of a community as a safeguard against future scarcity. Almost all of what is called the reserve of a bank is used as a safety fund to meet the unforeseen demands of note holders and depositors, and, in particular, to meet a "run" on the bank. These reserves often remain as idle as a fire extinguisher for years or even decades. It is said

that there are bars of precious metals in the Bank of England which have lain there undisturbed for two centuries. A large part of the cash carried by an ordinary individual is quite analogous to a bank reserve, being held to meet special emergencies. Some individuals even keep in a separate pocket a special gold piece, lest some day they should become "stranded." It may be said that this risk-meeting function of pocket cash is the chief compensation for the so-called "loss of interest" on the money thus carried. The convenience and security obtained by having an adequate supply is a species of income replacing the income which might be earned were the sum invested.

(*c*) *The Method of increasing Knowledge.* The third method of reducing risks is by increasing knowledge. Risk is nothing but an expression of ignorance, and decreases with the progress of knowledge. It may be said that the chief progress now being made industrially consists in lifting the veil which hides the future. Countless trade journals have their main reason for existence in enabling their readers better to forecast the future, by supplying them with data as to past and present conditions, as well as by instructing them in the relations of cause and effect. Government reports of crops, technical schools, and agricultural colleges, all tend in the same direction. Whereas formerly the mine prospector could only guess wildly at the ore "in sight" and the time and cost required to mine it, the graduate of a mining school is now able, through knowledge of geology and metallurgy, to bring these forecasts into some degree of scientific accuracy. And whereas until recently farming was one of the most uncertain of occupations, it is to-day — thanks to modern scientific agriculture — almost if not quite as amenable to prediction as industry or commerce.

(*d*) *The Method of Insurance.* We come now to that important means of avoiding and shifting risks called insurance. Insurance involves the offsetting of one risk by another; that is, the consolidation in an insurance company of a

large number of chances whereby relative certainty is, as it were, manufactured out of uncertainty.

One effect of insurance on the individual is to steady the income from his property. The owner of a house would receive, if it were not insured, let us say, a net annual income, after providing for depreciation, of 5 per cent on $10,000, or $500 a year until the house was burned, after which he would receive nothing; whereas, if he insures, he receives this $500 income less his premium up to the date of the fire, and afterward the income from the indemnity paid him by the company.

The same principles apply to other forms of insurance, — such as marine insurance, which, by consolidating in an insurance company the risk on a large number of vessels, reduces for the individual even the perils of the sea to relative certainty and regularity; or steam boiler insurance, which in a similar manner treats the risks of explosion; or plate-glass insurance, burglar insurance, live stock insurance, hail and cyclone insurance, fidelity insurance, accident insurance, employer's liability insurance, and, above all, life insurance. The last-named form of insurance, like the others, tends to steady the income of the beneficiary. If a wife holds insurance on her husband's life, the consequence is that, although what he gives her during his life is somewhat diminished, her income will not suddenly cease at his death. The tendency of insurance here, as elsewhere, is to make regularity out of irregularity, relative certainty out of relative uncertainty; and where, under the form of insurance contracts, the opposite result follows, the case is not one of true insurance, but tends to become one of gambling. Thus, if a person insures the life of some one in whom he has no financial interest, he is merely gambling on that person's life. Some years ago in Michigan there was an abuse of this type, called "graveyard insurance." Speculators went through the form of insuring the lives of certain old persons, — in other words, of betting on their

deaths, a procedure not only vicious as gambling, but calculated also to lead to crime. The same considerations apply to fire insurance, where a person insures a building in which he is not financially interested, or over insures one in which he is.

(*e*) *Shifting Risks to Speculators. Dangers of Imitative Speculation.* Where risks cannot be reduced to a statistical basis, and therefore cannot be insured against, recourse is often had to the shifting of the risks into the hands of those who are willing to take them. Such persons are called speculators. A speculator is usually one in whom caution is not so pronounced as in the ordinary individual. In extreme cases he tends to become a simple gambler. The distinction between a speculator and a gambler, however, is usually fairly well marked. A gambler seeks and makes risks which it is not necessary to assume, whereas the speculator merely assumes those risks of business which must fall somewhere. A speculator is also usually fitted for his work by special knowledge, so that the risk *to him*, owing to superior foresight, is at the outset less than it would be to others. The common indiscriminate prejudice against all speculation is unjust and unfortunate; for, were there no speculators, the same risks would have to be borne by those less fitted to bear them. The chief evils of speculation flow from the participation of the general public, which lacks the special knowledge, and which enters the market in a purely gambling spirit. In addition to suffering the usual evil consequences of gambling, they produce evil consequences for the non-participating public by increasing instead of decreasing the fluctuations in the values of the products or property in which they speculate.

The evils of speculation are particularly acute when, as generally happens with the investing public, the forecasts are not made independently. Were it true that each individual speculator made up his mind without consultation with others as to the future course of events, the errors of some would probably be offset by those of others. But, as a

matter of fact, the mistakes of the common herd are usually in the same direction. Like sheep, they tend to follow the same leader. We see, then, that where speculation is imitative, it is in the end injurious—alike to those who engage in it and to the public which pays or receives the artificial prices thus created. Where, on the other hand, speculation is based on independent knowledge, it is usually of great utility. It operates both to *reduce* risk by means of utilizing the special knowledge of speculators, and also to *shift* risk from those who lack this knowledge to those who possess it. The normal consequence is that speculative property will gravitate into the hands of those most able to forecast its true income.

Modern production has been called capitalistic speculative production, owing to the fact that it is managed by "captains of industry," who are specially fitted at once to forecast and to mold the future within the special realms in which they operate. The industries of transportation and manufacturing particularly are under the lead of an educated and trained speculative class, whose function it is to assume for themselves the main risks, and leave the ordinary investor, who is not so equipped, to coöperate as a mere "lender" or silent partner. Yet it often happens that these "captains" betray the confidence placed in them, and continue to throw the burden of risk on those whom they pretend to shield.

§ 6. Review

The preceding chapters are intended to give a definite picture of the mass of capital and its benefits to man. In such a picture we see man standing in the midst of a physical universe; the events of this universe affect his life favorably or unfavorably. Over many of these events he can exercise no control or selection; they constitute his natural environment. Over others he exercises selection and control by assuming dominion over part of the physical universe and fashioning it to suit his own needs. The parts of the material

world which he thus appropriates constitute wealth, whether they remain in their natural state or are "worked up" by him into products to render them more suitable to his needs. This mass of instruments will consist, first, of the appropriated parts of the surface of the earth, of the buildings and structures attached to the soil, and of the movable objects or "commodities" which man possesses and stores up; and secondly, of the human beings themselves, for these, though they are also the abode of the owners of wealth, are themselves owned objects.

This mass of instruments serves man's purpose in so far as its possession enables him to modify the stream of occurrences. By means of land and the modifications to which he subjects it he is enabled to increase and improve the growth of the vegetable and animal kingdoms in such a way as to supply him with food and the materials for constructing other instruments. By means of dwellings and other buildings he is enabled to avert or minimize the unfavorable effects of the elements upon his body and upon the articles of wealth which he stores in those buildings. By means of machinery, tools, and other instruments of production, he is enabled to fashion new instruments, to add to his store of goods or to supply the place of those destroyed or worn out. By means of the final finished products which minister to his more immediate enjoyments — such, for instance, as food, clothing, books, ornaments — he is enabled to consummate the objects for which the entire mass of wealth is produced and kept in existence, namely, the satisfaction of his desires, whether these be for the necessities, the comforts, the luxuries, or the amusements of life. In these and other ways the stock of wealth will modify the course of natural events in ways more or less agreeable to the owner. These desirable changes in the stream of events which occur by means of wealth constitute the benefits of wealth. But these benefits are obtained by dint of certain costs. In the last analysis costs are simply human efforts, and benefits are simply human

satisfactions; but the interval between efforts and satisfactions is divided into so many stages, and at each of these stages there are so many processes of production or exchange that these intermediate occurrences, or interactions, are much more in evidence than either the efforts which precede them or the satisfactions which follow. Each interaction is accounted as a benefit in one aspect and a cost in another. Their values are, at bottom, merely the discounted values of the future benefits (less costs) to which they lead.

The whole economic structure therefore — all that is represented in capital and income accounts — rests on two ultimate elements, viz. efforts and satisfactions. These enter our accounts, transformed simply by being multiplied or divided by prices, including that important price called the rate of interest. By means of such price factors we reach from these elements first the interactions which depend on them; then the complete income and outgo accounts (containing the values of interactions, efforts, and satisfactions), and then the capital accounts (containing the discounted values of the items in the income accounts).

To recapitulate in a few words the nature of capital and income, we may say that those parts of the material universe which at any time are under the dominion of man, constitute his capital-wealth; its ownership, his capital-property; its value, his capital-value. Capital implies anticipated income, which consists of a stream of benefits or its value. When values are considered, the causal relation is not from capital to income, but from income to capital; not from present to future, but from future to present. In other words, the value of capital is the discounted value of the expected income. The fluctuations of this capital-value will, chance aside, be equal and opposite to the divergencies of "realized income" from "standard income"; whereas, when the influence of chance is included, there will be in addition to these fluctuations still others which mirror the successive changes in the outlook for future income.

CHAPTER VIII

THE EQUATION OF EXCHANGE

§ 1. Introductory

We have now finished the first great division of our subject, — Economic Accounting. We have gained a picture of wealth, property, benefits, costs, capital, and income. Our study has so far consisted in pointing out the fundamental relations between these various concepts, and particularly between capital and income.

All of these relations find expression through the medium of prices. By prices, as we have seen, a miscellaneous collection of goods may be translated into a homogeneous mass of money values. Only by such reduction to a common money basis are capital and income accounts possible. Capital accounts and income accounts are mosaics of heterogeneous elements fitted together by prices. But in all the capital and income accounts to which reference has thus far been made, and in all our previous discussions, we have taken prices for granted. We have, in other words, started out in our investigations upon the assumption that prices were fixed and known. But inasmuch as prices themselves are the outcome of economic forces, they must in turn be made the subject of analysis, and we must consequently now take up the second part of our task, which consists in discovering the principles that determine prices.

If one were to ask how the price of wheat is determined, the immediate answer would probably be: By supply and demand. This answer, though correct so far as it goes, is lamentably superficial. It is well to be on one's guard against glib phrases which are so often substituted for real

analyses: "Supply and demand" is such a phrase. A long time ago, when economics consisted rather of glib phrases than of real analyses, a critic of the science said, "If you want to make a first-class economist, catch a parrot and teach him to say 'supply and demand' in response to every question you ask him. What determines wages? Supply and demand. What determines interest? Supply and demand. What determines the distribution of wealth? Supply and demand." In every instance the answer is right, but it explains nothing. We must discover the forces which determine supply and demand. In so doing we shall learn that to determine the price even of one simple commodity, like wheat, involves practically all the principles of economic science. We are not yet ready to undertake the full study of the supply and demand of any article. For the present we shall concern ourselves only with one of the important forces underlying the supply and demand of all articles. That force is *the purchasing power of money*, a force as subtle as it is omnipresent. As every price is expressed in money, it is evident that the willingness to take or give a certain amount of any article at a given price in money depends on the willingness to give or take a certain amount of *money* in exchange. This willingness to give or take money depends on the purchasing power of money over other things. Will a man pay 10 cents a pound for sugar? That depends on whether or not he wants the sugar more than something else purchasable with the 10 cents. The man, in other words, balances in his mind the sugar and the money, — the latter standing in his mind for any other thing he could spend it for. If the purchasing power of money is high, he will be more reluctant to part with a given amount for a given quantity of sugar than if it is low. The seller, on the other hand, is more ready to take money when it has a high than when it has a low purchasing power. Hence, if in a given year money has a high purchasing power, the price of sugar will be lower than if money has a low purchasing power.

The price of any particular article will be low if money has a high purchasing power; *that is, if the prices of articles in general are low.* It is therefore clear that the money price of every particular commodity *depends partly on the prices of other commodities, i.e.* on the general level of prices, just as the actual height reached by a particular wave of the sea depends partly on the general level of the ocean.

The phrases " the purchasing power of money " and " the general level of prices " are reciprocal. To say that the purchasing power of money is high or low is the same thing as to say that the general level of prices is low or high. If the first is doubled, the second is halved, and *vice versa.*

It is possible to study the general level of prices independently of particular prices, just as it is possible to study the general tides of the ocean independently of its particular waves. It is not only more logical to study the general price level first, but this order of study has also the advantage of acquainting us as early as possible with the nature of money.

Therefore, before we attempt to explain even the demand and the supply of wheat, we shall undertake the study of prices in general.

In practice, money is a most convenient device, but in theory it is always a stumbling block to the student of economics, who is exceedingly prone to misunderstand its functions. At the beginning of this book we pointed out some of the *supposed* functions of money that do *not* belong to it. We are now in a position to ask: What *are* the *real* functions of money?

§ 2. The Nature of Money

We define money as *what is generally acceptable in exchange for goods.* The facility with which it may be thus exchanged, or its general acceptability, is its distinguishing characteristic. This general acceptability may be reënforced by law, the money thus becoming what is known as " legal tender "; but such reënforcement is not essential. All that is necessary

in order that any good may be money is that general acceptability attach to it. On the frontier, without any legal sanction, money is sometimes gold dust or gold nuggets. In the colony of Virginia it was tobacco. Among the Indians in New England it was wampum.

How does it happen that these things come into use as money? If we consider, for instance, the tobacco money of the Virginia colony before metallic money came in from Europe, it is not difficult to see how (in all probability) it first became money. When a man in Virginia had a particular commodity to sell, say a piece of land, and he looked about for a purchaser, he may have found a man who wanted that piece of land and sought to make a trade with him. He found this man willing, let us suppose, to take that piece of land in exchange for cattle, slaves, tobacco, jewelry, musical instruments, etc., or for collections of various articles, but he wanted none of these things. Under these circumstances, we may suppose the proposed purchaser of the land to have said, "I have a lot of tobacco, which I will give you for the land," and the landowner to have replied, "I do not smoke; I do not want the tobacco." We may then suppose the purchaser to have said, "But tobacco is easily salable; many people want it; it is so easy to carry and to keep that you will find no difficulty in disposing of it; will you not take it *temporarily*, and instead of smoking it yourself, find somebody to take it in trade." Whereupon the landowner sells his land for the tobacco — not in order to use it himself, but in order to sell it to some smoker. When, however, he sets about finding the smokers in the community, he may have some difficulty in disposing of his tobacco, just as did the previous owner of the tobacco. But he can then follow the example of the previous owner, that is, find somebody who has the things that he wants, and whom he can induce to take the tobacco temporarily. In this way the tobacco may pass through many hands, in each of which it rests only temporarily before it is passed on. Gradually, in this manner, it

becomes customary to take tobacco just for the purpose of passing it on, and not for the purpose of smoking it; and after a time it is even prepared in a way not adapted to smoking, but convenient for passing on. At last everybody takes the tobacco simply because he expects others to take it; everybody gets it only to get rid of it. It is then said to *circulate* as a medium of exchange.

It was doubtless in some such way that gold came into use as money. Gold is easily transportable and durable. People who did not want it for ornaments took it to sell to people who did want it for ornaments, and after a while it came to be coined for the purpose of being handed on. At first a number of different things were used for money; but finally it was found that one thing was much more convenient than the others, and it became the money *par excellence* of the community. Tobacco acquired this function in Virginia; gold possesses it to-day, having survived the competitive process by which a great many other kinds of money were tried out and found less suited to the purpose.

There are various degrees of exchangeability which must be transcended before we arrive at real money. Of all forms of property, one of the *least* exchangeable is real estate. Only in case some person happens to be found who wants it can a piece of real estate be traded. A mortgage on real estate is one degree more exchangeable. Yet even a mortgage is less exchangeable than a well-known and safe corporation security; and a corporation security is less exchangeable than a government bond. In fact, persons not infrequently buy government bonds as merely temporary investments, intending to sell them again as soon as permanent investments yielding better interest are obtainable. One degree more exchangeable than a government bond is a bill of exchange; one degree more exchangeable than a bill of exchange is a sight draft; while a check is almost as exchangeable as money itself. Yet no one of these is really money, for none of them is "*generally* acceptable."

If we confine our attention to present and normal conditions, and to those means of exchange which either are money or most nearly approximate it, we shall find that money itself belongs to a general class of property rights which we may call "circulating media." A circulating medium includes any type of property right which, whether generally acceptable or not, does actually, for its chief purpose and use, serve as a means of exchange.

Circulating media are of two chief classes: (1) money; (2) bank deposits, which will be treated fully in the next chapter. By means of checks, bank deposits serve as a means of payment in exchange for other goods. A check is the "certificate" or evidence of the transfer of bank deposits. It is acceptable to the payee only by his consent. It would not be generally accepted by strangers. Yet by checks, bank deposits, even more than money, do actually serve as a medium of exchange.

But while a bank deposit (transferrable by check) is included in circulating media, it is not money. A bank *note*, on the other hand, is both circulating medium and money. Between these two lies the final line of distinction between what is money and what is not. True, the line is delicately drawn, especially when we come to such checks as cashier's checks or certified checks. For the latter are almost identical with bank notes. Each is a demand liability on a bank, and each confers on the holder the right to draw money. Yet while a note is *generally* acceptable in exchange, a check is only *specially* acceptable, *i.e.* only by the consent of the payee. Real money-rights are what a payee accepts without question, either because he is induced to do so by "legal tender" laws or because he is induced to do so by a well established custom.

Of real money there are two kinds: primary and fiduciary. Money is called *primary* if it is a commodity which has just as much value in some use other than money as it has in monetary use. Primary money has its full value

independently of any other wealth. Fiduciary money, on the other hand, is money the value of which depends partly or wholly on the confidence that the owner can exchange it for other goods, *e.g.* for primary money at a bank or government office or at any rate for discharge of debts or purchase of goods of merchants. The chief example of primary money is gold coin. The chief example of fiduciary money is bank notes. The qualities of primary money which make for exchangeability are numerous. The most important are portability, durability, and divisibility. The chief quality of fiduciary money, which makes it exchangeable, is its redeemability in primary money, or its imposed character of legal tender.

Bank notes and all other fiduciary money, as well as bank deposits, circulate by certificates often called "tokens." "Token" coins are included in this description. The value of these tokens, apart from the rights they convey, is small. Thus the value of a silver dollar, as wealth, is only about forty cents; that is all that the actual silver in it is worth. Its value as property, however, is one hundred cents; for its holder has a legal right to use it in paying a debt to that amount, and a customary right to so use it in payment for goods. Likewise, the property value of a fifty-cent piece, a quarter, a ten-cent piece, a five-cent piece, or a one-cent piece is considerably greater than its value as wealth. The value of a paper dollar as wealth — for instance, a treasury note or silver certificate — is almost nothing. It is worth just its value as paper, and no more. But its value as property is a hundred cents, that is, the equivalent of one gold dollar. It represents to that extent a claim of the holder on the wealth of the community.

Figure 6 indicates the classification of all circulating media in the United States. It shows that the total amount of circulating media is about $8\frac{1}{2}$ billions, of which about 7 billions are bank deposits subject to check, and $1\frac{1}{2}$ billions, money; and that of this $1\frac{1}{2}$ billions of money 1 billion are

fiduciary money and only about $\frac{1}{2}$ a billion primary money.

In the present chapter we shall exclude the consideration of bank deposit or check circulation and confine our attention to the circulation of money, primary and fiduciary. In

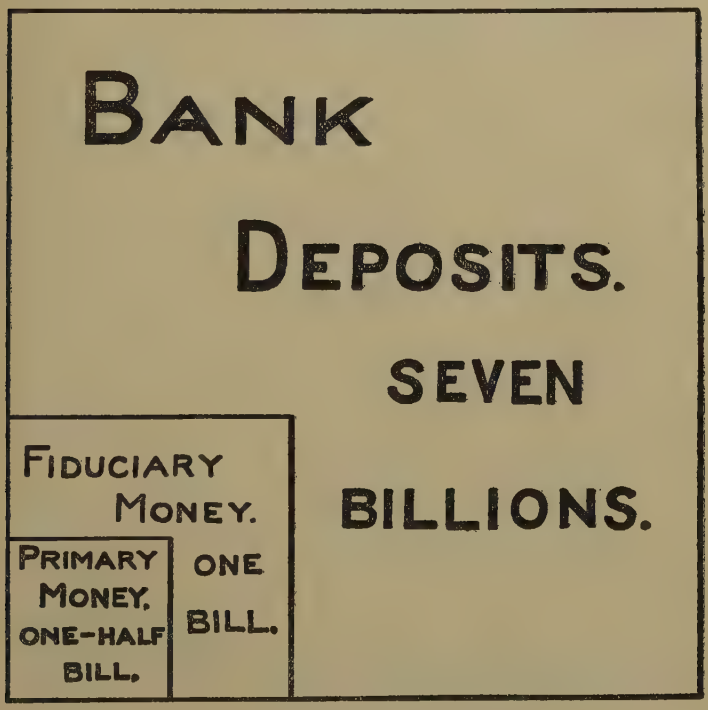


FIG. 6.

the United States, the only primary money is gold coin. The fiduciary money includes (1) token coins, viz. silver dollars, fractional silver, and minor coins ("nickels" and cents); (2) paper money, viz.: (*a*) certificates for gold and silver; and (*b*) promissory notes, whether of the United States government ("greenbacks"), or of the national banks ("bank notes").

Checks aside, we may classify exchanges into three groups: the exchange of goods against goods, or barter; the exchange of money against money, or "*changing*" money, and the exchange of money against goods, or *purchase and sale.* Only the last-named species of exchange makes up what we call the *circulation* of money. The circulation of money signifies, therefore, the aggregate amount of its transfers against goods. All money available for circulation, *i.e.* all money except what is in the banks' and United States government's vaults, is called *money in circulation.*

§ 3. The Equation of Exchange, Arithmetically Expressed

The price level may be said to depend on only three sets of causes: (1) the quantity of money in circulation; (2) its "efficiency" or velocity of circulation (or the average number of times a year money is exchanged for goods); and (3) the volume of trade (or amount of goods bought by money). The "quantity theory" has often been incorrectly formulated, but it is correct in the sense that the level of prices varies directly with the quantity of money in circulation, provided the velocity of circulation of that money and the volume of trade which it is obliged to perform are not changed.

This will be made more clear by the equation of exchange, which is now to be explained.

The equation of exchange is a statement, in mathematical form, of the total transactions effected in a certain period in a given community. It is obtained simply by adding together the equations of exchange for all individual transactions. Suppose, for instance, that a person buys 10 pounds of sugar at 7 cents per pound. This is an exchange transaction, in which 10 pounds of sugar have been regarded as equal to 70 cents, and this fact may be expressed thus: 70 cents = 10 pounds of sugar multiplied by 7 cents a

pound. Every other sale and purchase may be expressed similarly, and by adding them all together we get the equation of exchange *for a certain period in a given community.* During this period, however, the *same* money may serve, and usually does serve, for *several* transactions. For that reason the money side of the equation does not represent the total amount of money in circulation. For instance, the same 70 cents may figure in 10 different transactions during the period under study, and thus perform the work, so to speak, of $7 used but once. The equation has a goods side and a money side. The money side is the total money paid, and may be considered as the product of the quantity of money multiplied by its rapidity of circulation. The goods side is made up of quantities of goods multiplied by their respective prices.

Let us begin with the money side. If the number of dollars in a country is 5,000,000, and the velocity of circulation is twenty times per year, then the total amount of money changing hands during any year is 5,000,000 times twenty or $100,000,000.

Since the money side of the equation of exchange is $100,000,000, the goods side must be the same. For if $100,000,000 has been spent for goods in the course of the year, then $100,000,000 worth of goods must have been sold in that year. In order to avoid the necessity of writing out the quantities and prices of the innumerable varieties of goods which are actually exchanged, let us assume for the present that there are only three kinds of goods, — bread, coal, and cloth; and that the sales are: —

200,000,000 loaves of bread at $ .10 a loaf,
10,000,000 tons of coal at 5.00 a ton, and
30,000,000 yards of cloth at 1.00 a yard.

The value of these transactions is evidently $100,000,000, — *i.e.* $20,000,000 worth of bread plus $50,000,000 worth of coal plus $30,000,000 worth of cloth. The equation of ex-

change therefore (remember that the money side consisted of $5,000,000 exchanged 20 times) is as follows: —

$5,000,000 × 20 times a year =
200,000,000 loaves × $ .10 a loaf +
10,000,000 tons × 5.00 a ton +
30,000,000 yards × 1.00 a yard.

This equation on the money side contains two magnitudes, viz.: (1) the quantity of money and (2) its velocity of circulation; and, on the goods side, two *groups* of magnitudes in two columns, viz.: (1) the quantities of goods exchanged (loaves, tons, yards), and (2) the prices of these goods. The equation shows that these four sets of magnitudes are mutually related. The prices, for instance, bear a relation to the three other sets of magnitudes, quantity of money, rapidity of circulation, and quantities of goods exchanged. Consequently these prices must, as a whole, vary proportionally with the quantity of money and with its velocity of circulation, and inversely with the quantities of goods exchanged.

Suppose, for instance, that the quantity of money were doubled, while its velocity of circulation and the quantity of goods exchanged remained the same. Then it would be quite impossible for prices to remain unchanged. The money side would now be $10,000,000 × 20 times a year or $200,000,000; whereas, if prices should not change, the goods would remain $100,000,000 and the equation would be violated. Since exchanges, individually and collectively, always involve an equivalent *quid pro quo*, the two sides *must* be equal. Not only must purchases and sales be equal in amount, since every article bought by one person is necessarily sold by another, but the total value of goods sold must equal the total amount of money exchanged. Therefore, under the given conditions, prices must change in such a way as to raise the goods side from $100,000,000 to $200,000,000. This doubling may be accomplished by an even or uneven rise in prices, but some sort of *a rise of prices*

there must be. If the prices rise evenly, they will evidently all be exactly doubled, so that the equation will read: —

$10,000,000 × 20 times a year =
200,000,000 loaves × $ .20 per loaf +
10,000,000 tons × 10.00 per ton +
30,000,000 yards × 2.00 per yard.

If the prices rise unevenly, the doubling must evidently be brought about by compensation; if some prices rise by less than double, others must rise by enough more than double to exactly compensate.

But whether all prices increase uniformly, each being exactly doubled, or some prices increase more and some less (so as still to double the total money value of the goods purchased) the prices *are* doubled *on the average.* This proposition is usually expressed by saying that the " general level of prices " is raised twofold. From the mere fact, therefore, that the money spent for goods must equal the quantities of those goods multiplied by their prices, it follows that the level of prices must rise or fall according to changes in the quantity of money, *unless* there are changes in its velocity of circulation or in the quantities of goods exchanged.

If changes in the quantity of money affect prices, so will changes in these other factors — quantity of goods and velocity of circulation — affect prices, and in a very similar manner. Thus a doubling in the velocity of circulation of money will double the level of prices, provided the quantity of money in circulation and the quantities of goods exchanged for money remain as before. The equation will become —

$5,000,000 × 40 times a year =
200,000,000 loaves × $ .20 a loaf +
10,000,000 tons × 10.00 a ton +
30,000,000 yards × 2.00 a yard,

or else the equation will assume a form in which some of the

prices will more than double, and others less than double by enough to preserve the same total value of the sales.

Again, a doubling in the quantities of goods exchanged will (not double but) halve the height of the price level, *provided* the quantity of money and its velocity of circulation remain the same. Under these circumstances the equation will become: —

$5,000,000 × 20 times a year =
400,000,000 loaves × $ .05 a loaf +
20,000,000 tons × 2.50 a ton +
60,000,000 yards × .50 a yard,

or else it will assume a form in which some of the prices are more than halved, and others less than halved, so as to preserve the equation.

Finally, if there is a simultaneous change in two or all of the three influences, *i.e.* quantity of money, velocity of circulation, and quantities of goods exchanged, the price level will be a compound or resultant of these various influences. If, for example, the quantity of money is doubled, and its velocity of circulation is halved, while the quantity of goods exchanged remains constant, the price level will be undisturbed. Likewise it will be undisturbed if the quantity of money is doubled and the quantity of goods is doubled, while the velocity of circulation remains the same. To double the quantity of money, therefore, is not always to double prices. We must distinctly recognize that the quantity of money is only one of three factors, all equally important as determinants of the price level.

§ 4. The Equation of Exchange Mechanically Expressed

The equation of exchange has now been expressed by an arithmetical illustration. It may be represented visually by a mechanical illustration. Such a representation is embodied in Figure 7. This represents a mechanical balance

in equilibrium, the two sides of which symbolize respectively the money side and the goods side of the equation of exchange. The weight at the left, symbolized by a purse, represents the money in circulation; the "arm" or distance from the fulcrum at which this weight (purse) is hung represents the efficiency of this money, or its velocity of circulation; and the product of the weight by its "arm," [1] known in mechanics as the moment of rotation, represents the money side of the equation of exchange; that is, the total circulation or value of exchange work done. In

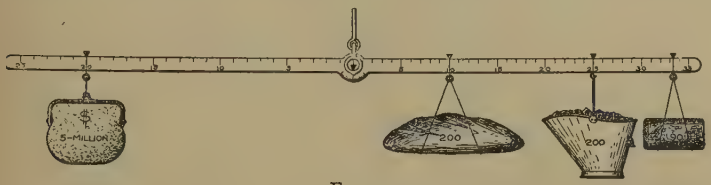


FIG. 7.

accordance with the mechanical principles of a balance this is equal to, or balanced by, corresponding magnitudes on the opposite side. On that side are three weights: bread, coal, and cloth, symbolized respectively by a loaf, a coal scuttle, and a roll of cloth. The arm, or distance of each from the fulcrum, represents its price. In order that the lever arms at the right may not be inordinately long, we have found it convenient to reduce the unit of measure of coal from tons to hundredweights, and those of cloth from yards to feet, and consequently to enlarge correspondingly the numbers of units: the measure of coal changing from 10,000,000 tons to 200,000,000 hundredweights, and that of the cloth from 30,000,000 yards to 90,000,000 feet. The price of coal in the new unit per hundredweight becomes 25 cents, and that of cloth in feet becomes $33\frac{1}{3}$ cents. If, now, we assume that the velocity of circulation of money remains the same (that is, that the left arm does not either

[1] No necessary relation need exist between the units of length employed for measuring the arms to the right and those to the left.

lengthen or shorten), and that the trade remains the same (that is, that the weights at the right do not either increase or decrease), then it follows that the increase of the money at the left will require a lengthening of one or more of the arms at the right, representing prices, and that if these prices increase uniformly, they will increase in the same ratio as the increase in money; and that, if they do not increase uniformly, some will increase more and some less than this ratio, maintaining an average.

Likewise it is evident that if the velocity of circulation of money increases, *i.e.* if the arm at the left lengthens and if

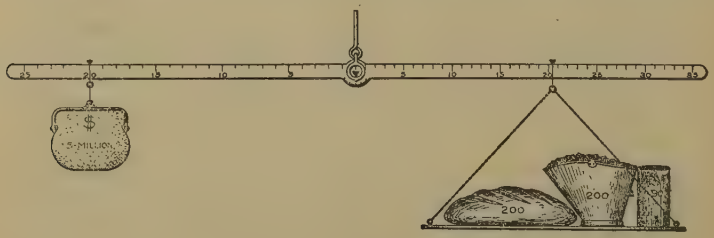


FIG. 8.

the money in circulation and the trade (the various weights) remain the same, there must be an increase in prices (lengthening of the arms at the right).

Again, if there is an increase in the volume of trade (represented by an increase in weights at the right), and if the velocity of circulation of money (left arm) and the quantity of money (left weight) remain the same, there must be a decrease in prices (right arms).

In general, any change in the four sets of magnitudes must be accompanied by such a change or changes in one or more of the other three as shall maintain equilibrium.

As we are interested in the average change in prices rather than in the prices individually, we may simplify this mechanical representation by hanging all the right-hand weights at one average point, so that the arm shall represent the average prices. This arm is a " weighted average " of the

three original arms, the weights being literally the weights hanging at the right.

This averaging of prices is represented in Figure 8, which visualizes the fact that the average price of goods (right arm) varies directly with the quantity of money (left weight), and directly with its velocity of circulation (left arm), and inversely with the volume of trade (right weight).

§ 5. The Equation of Exchange Algebraically Expressed

To put these relations in general terms, we may use an algebraic formula: —

$$MV = p\,Q + p'Q' + p''Q' + \text{etc.}$$

The quantity of money in circulation we call M, and the velocity of circulation, V. Then MV equals the amount of money expended for goods during the year. On the other side, p is the price of any good, and Q its quantity; p' the price of another, and Q' its quantity, and so on. If in this equation M is doubled (and V and the Q's remain unchanged), then the p's will, on the average, be doubled; if V is doubled, (and M and the Q's are unchanged), the p's will be doubled also; while if the Q's are doubled (and M and V are unchanged), the p's will be halved.

The right side of this equation is the sum of terms of the form pQ — a price multiplied by a quantity bought. It is customary in mathematics to abbreviate a sum of terms (all of which are of the same form) by using "Σ" as a symbol of summation. This symbol does not signify a *magnitude* as do the symbols M, V, p, Q, etc. It signifies merely the *operation* of addition, and should be read "the sum of terms of the following type." The equation of exchange may now be written very simply: —

$$MV = \Sigma pQ$$

We may, if we wish, further simplify the right side in the form PT where P is a weighted average of all the p's, and T is the sum of all the Q's. P then represents in one magnitude the level of prices, and T represents in one magnitude the volume of trade. This simplification is the algebraic interpretation of the mechanical illustration given in Figure 8, where all the goods, instead of being hung separately, as in Figure 7, were combined and hung at an average point representing their average price.

§ 6. The "Quantity Theory" of Money

To recapitulate, we find then that, under the conditions assumed, the price level varies (1) directly as the quantity of money in circulation (M), (2) directly as the velocity of its circulation (V), (3) inversely as the volume of trade done by it (T). The first of these three relations is the most important. It constitutes the "quantity theory of money."

So important is this principle, and so bitterly contested has it been, that we shall illustrate it further. By "the quantity of money" is meant the number of dollars (or other given monetary units) in circulation. This number may be changed in several ways, of which the following three are most important. They serve to bring home to us the conclusions we have reached and to reveal the fundamental peculiarity of money on which they rest.

As a first illustration, let us suppose the government to double the *denominations* of all money; that is, let us suppose that what has been hitherto a half dollar is henceforth called a dollar, and that what has hitherto been a dollar is henceforth called two dollars. Evidently the number of "dollars" in circulation will then be doubled; and the price level, measured in terms of the new "dollars," will be double what it would otherwise be. Every one will pay out the *same coins* as though no such law were passed. But he will, in each case, be paying twice as many "*dollars*." For

example, if $3. formerly had to be paid for a pair of shoes, the price of this same pair of shoes will now become $6. Thus we see how the *nominal* quantity of money affects price levels.

A second illustration is found in a *debased currency*. Suppose a government cuts each dollar in two, coining the halves into new "dollars"; and recalling all paper notes, replaces them with double the original number — two new notes for each old one of the same denomination. In short, suppose money not only to be *renamed*, as in the first illustration, but also *reissued*. Prices in the debased coinage will again be doubled just as in the first illustration. The subdivision and recoinage is an immaterial circumstance, unless it be carried so far as to make counting difficult and thus to interfere with the *convenience* of money. Wherever a dollar had been paid before debasement, two dollars — *i.e.* two of the old halves coined into two of the new dollars — will now be paid instead.

In the first illustration, the increase in quantity was simply nominal, being brought about by renaming coins. In the second illustration, besides renaming, the further fact of recoining is introduced. In the first case the number of actual pieces of money of each kind was unchanged, but their denominations were doubled. In the second case, the number of pieces is also doubled by splitting each coin and reminting it into two coins, each of the same nominal denomination as the original whole of which it is the half, and by similarly redoubling the paper money.

For a third illustration, suppose that, instead of doubling the number of dollars by splitting them in two and recoining the halves, the government *duplicates* each piece of money in existence and presents the duplicate to the possessor of the original. We must in this case suppose, further, that there is some effectual bar to prevent the melting or exporting of money. Otherwise the quantity of money in circulation will not be doubled: much of the increase will escape. But

if the quantity of money *is* doubled, prices will also be doubled just as truly as in the second illustration, in which there were exactly the same number of coins as now under consideration as well as the same denominations. The only difference between the second and the third illustrations will be in the size and weight of the coins. The weights of the individual coins, instead of being reduced, will remain unchanged; but their number will be doubled. This doubling of coins must have the same effect as the 50 per cent debasement, *i.e.* the effect of doubling prices.

The force of the third illustration becomes even more evident if, in accordance with Ricardo's presentation, we pass back by means of a seigniorage from the third illustration to the second. That is, after duplicating all money, let the government subtract half of each coin, thereby reducing the weight to that of the debased coinage in the second illustration, and removing the only point of distinction between the two. This "seigniorage" abstracted will not affect the value of the coins, so long as their *number* remains unchanged. In short, the quantity theory asserts that (provided velocity of circulation and volume of trade are unchanged) if we increase the *number* of dollars, whether by renaming coins, or by debasing coins, or by increasing coinage, or by any other means, prices will be increased in the same proportion. It is the number, and not the weight, that is essential. This fact needs great emphasis. It is a fact which differentiates money from all other goods and explains the peculiar manner in which its purchasing power is related to other goods. Sugar, for instance, has a specific desirability dependent on its quantity in pounds. Money has no such quality. The value of sugar depends on its *actual quantity*. If the quantity of sugar is changed from 1,000,000 pounds to 1,000,000 hundredweight, it does not follow that a hundredweight will have the value previously possessed by a pound. But if money in circulation is changed from 1,000,000 units of one weight to 1,000,000

units of another weight, the value of each unit will remain unchanged.

The quantity theory of money thus rests, ultimately, on a peculiarity which money alone of all goods possesses, — the fact that it has no power to satisfy human wants except a power *to purchase* things which do have such power.

CHAPTER IX

DEPOSIT CURRENCY

§ 1. The Mystery of Circulating Credit

We are now ready to explain the nature of bank deposit currency, or circulating credit. Credit, in general, is the claim of a creditor against a debtor. Bank deposits subject to check are the claims of the creditors of a bank against the bank, by virtue of which they may, on demand, draw by check specified sums of money from the bank. Since no other kind of bank deposits will be considered by us, we shall usually refer to " bank deposits subject to check " simply as " bank deposits." They are also called " circulating credit." But as the first step we must enlarge upon our analysis of circulating media by adding a discussion of bank checks, by means of which credit is put into effect. Bank checks, then, are merely certificates of rights to draw bank deposits or to transfer them. The checks are not currency. It is the bank deposits themselves, or credit balances on the books of the banks, that constitute the real currency. Nor are these deposits actual money. They are not money, because they are not *generally* acceptable; they always require the special consent of the payee. But they are *currency*, because their chief purpose and use is to act as a medium of exchange. Closely analogous to checks are post office orders, and money orders issued by express companies. They are distinguishable only by two facts: that they are not issued by ordinary banks, and that they originate in *special* deposits of money or the equivalent of money. For this reason, and because they are not of great importance, we prefer to place them in the same category with bank checks rather than to place them in a third class, which otherwise they might occupy.

It is in connection with the transfer of bank deposits that there arises that so-called "mystery of banking" called circulating credit. Many persons, including some economists, have supposed that credit is a special form of wealth which may be created out of whole cloth, as it were, by a bank. Others have maintained that credit has no foundation in actual wealth at all, but is a kind of unreal and inflated bubble with a precarious if not wholly illegitimate existence. As a matter of fact, bank deposits are as easy to understand as bank notes, and what is said in this chapter of bank deposits may in substance be taken as true also of bank notes. The chief difference is a formal one, the notes circulating from hand to hand, while the deposit currency circulates only by means of special orders called checks.

To understand the real nature of bank deposits, let us imagine a hypothetical institution, — a kind of primitive bank existing mainly for the sake of deposits and the safe keeping of actual money. The original bank of Amsterdam was somewhat like the bank we are now imagining. In such a bank a number of people deposit $100,000 in gold, each accepting a receipt for the amount of his deposit. If this bank should issue a "capital account" or statement, it would show $100,000 in its vaults and $100,000 owed to depositors, as follows: —

Assets		Liabilities	
Gold	$100,000	Due depositors . .	$100,000

The right-hand side of the statement is, of course, made up of the amounts owed to individual depositors. Assuming that there is owed to A $10,000, to B $10,000, and to all others $80,000, we may write the bank statement as follows: —

Assets		Liabilities	
Gold	$100,000	Due depositor A . .	$ 10,000
		Due depositor B . .	10,000
		Due other depositors	80,000
	$100,000		$100,000

Now assume that A wishes to pay B $1000. A could go to the bank with B, present certificates or checks for $1000, obtain the gold, and hand it over to B, who might then redeposit it in the same bank, merely handing it back through the cashier's window and taking a new certificate in his own name. Instead, however, of both A and B visiting the bank and handling the money, A might simply give B a check for $1000. The transfer in either case would mean that A's holding in the bank was reduced from $10,000 to $9000, and that B's was increased from $10,000 to $11,000. The statement would then read: —

Assets		Liabilities	
Gold	$100,000	Due depositor A . .	$ 9,000
		Due depositor B . .	11,000
		Due other depositors .	80,000
	$100,000		$100,000

Thus the certificates, or checks, would circulate in place of cash among the various depositors in the bank. What really changes ownership, or "circulates," in such cases is the *right to draw* money. The check is merely the evidence of this right and of the transfer of this right from one person to another.

In the case under consideration, the bank would be conducted at a loss. It would be giving the time and labor of its clerical force for the accommodation of its depositors, without getting anything in return. But such a hypothetical bank would soon find — much as did the bank of Amsterdam — that it *could* "make money" by lending at interest some of the gold on deposit. This could not offend the depositors. These do not expect or desire to get back the identical gold they have deposited. What they want is simply to be able at any time to obtain the same *amount* of gold. Since, then, their arrangement with the bank calls for the payment not of any particular gold, but merely of a definite amount, and that but occasionally, the bank finds itself free to lend out part of the gold that otherwise would

lie idle in its vaults. To keep it idle would be a great and needless waste of opportunity.

Let us suppose, then, that the bank decides to loan out half its cash. This is usually done in exchange for promissory notes of the borrowers. *Now a loan is really a sale, the quid pro quo* being the promissory note which the lender — in this case the bank — receives in place of the gold. Let us suppose that so-called borrowers actually draw out $50,000 of gold. The bank thereby exchanges money for promises, and its books will then read: —

Assets		Liabilities	
Gold	$ 50,000	Due depositor A . .	$ 9,000
Promissory notes . .	50,000	Due depositor B . .	11,000
		Due other depositors	80,000
	$100,000		$100,000

It will be noted that now the gold in bank is only $50,000, while the total deposits are still $100,000. In other words, the depositors now have more "money on deposit" than the bank has in its vaults! But, as will be shown, this form of expression involves a popular fallacy, in the word "money." Something good *is* on deposit behind each loan, but not necessarily money.

Next, suppose that the *borrowers* become, in a sense, depositors also, by redepositing the $50,000 of cash which they borrowed, *in return for the right to draw out the same on demand.* In other words, suppose that after borrowing $50,000 from the bank, they lend it back to the bank. The bank's assets will thus be enlarged by $50,000, and its obligations (or credit extended) will be equally enlarged; and the balance sheet will become: —

Assets		Liabilities	
Gold	$100,000	Due depositor A . .	$ 9,000
Promissory notes . .	50,000	Due depositor B . .	11,000
		Due old depositors .	80,000
		Due new depositors,	
		i.e. the borrowers .	50,000
	$150,000		$150,000

Now what happened in each case was this: Gold was borrowed in exchange for a promissory note and then handed back in exchange for a right to draw. Thus the gold really did not budge; but the bank received a promissory note and the depositor a right to draw. Evidently, therefore, the same result would have followed if each borrower had merely handed in his promissory note and received, in exchange, a right to draw. As this operation most frequently puzzles the beginner in the study of banking, we repeat the tables representing the conditions before and after these "loans," *i.e.* these exchanges of promissory notes for present rights to draw.

BEFORE THE LOANS

ASSETS		LIABILITIES	
Gold	$100,000	Due depositors . .	$100,000

AFTER THE LOANS

Gold	$100,000	Due depositors . . .	$150,000
Promissory notes . .	50,000		

Clearly, therefore, the intermediation of the money in this case is a needless complication, though it may help to a theoretical understanding of the resultant shifting of rights and liabilities. Thus the bank may receive deposits of gold or deposits of promises; in exchange for the gold it gives a right to draw. In exchange for the promises it may give — or lend — either a right to draw, or gold — the same that was deposited by another customer. Even when the borrower has deposited only a promise, by fiction he is still held to have deposited money; and like the original cash depositors, he is given the right to make out checks. The total value of rights to draw, in whichever way arising, is termed *deposits*. Banks more often lend rights to draw (or deposit rights) than actual cash, partly because of the greater convenience to borrowers, and partly because the banks wish

to keep their cash reserves large, in order to meet large or unexpected demands. It is true that if a bank loans money, part of the money so loaned will be redeposited by the persons to whom the borrowers pay it in the course of business; but it will not necessarily be redeposited in the same bank. Hence the average banker prefers that the borrower should not withdraw actual cash.

Besides lending deposit rights, banks may also lend their own notes — called "bank notes." And the principle governing bank notes is much the same as the principle governing deposit rights. The holder simply gets a pocketful of bank notes instead of a bank account. In either case the bank must keep itself ready to pay the holder, — to "redeem its notes," — as well as pay its depositors, on demand, and in either case the bank exchanges a promise for a promise. In the case of the note, the bank has exchanged its bank note for a customer's promissory note. The bank note carries no interest, but is payable on demand. The customer's note bears interest, but is payable only at a definite date. Assuming that the bank issues $50,000 of notes, the balance sheet will now become: —

Assets		Liabilities	
Cash	$100,000	Due depositors . .	$150,000
Loans due the bank .	100,000	Due note holders . .	50,000
	$200,000		$200,000

We repeat, then, that by means of credit, the deposits of a bank may *exceed its cash*. There would be nothing mysterious or obscure about this fact, nor about credit in general, if people could be induced not to think of banking operations as money operations. To so represent them is metaphorical and misleading. They are no more money operations than they are real estate transactions. A bank depositor, A, has not ordinarily "deposited money"; and whether he has or not, he certainly cannot properly say that he "has money in the bank." What he does have is the bank's promise

to pay money on demand. The bank owes him money. When a private person owes money, the creditor never thinks of saying that he has it on deposit in the debtor's pocket.

And yet, the same principles of property which apply to bank deposits also apply to bank notes. There is wealth somewhere behind the mutual promises, though in different degrees of accessibility. The note holder's promise is secured by his assets; and the bank's promise is secured by the bank's assets. The note holder has "swapped" less-known credit for better-known credit. The accounts as they now stand include the chief features of an ordinary modern bank, — a so-called "bank of deposit, issue, and discount."

§ 2. The Basis of circulating Credit

If this fact is borne in mind, the reader will be able to conquer the doubt which may already have arisen in his mind, — the doubt as to the legitimacy of the bank's procedure in "lending some of its depositors' money." It cannot be too strongly emphasized that, in any balance sheet, the value of the liabilities rests on that of the assets. The deposits of a bank are no exception. We must not be misled by the fact that the *cash* assets may be less than the deposits. When the uninitiated first learn that the number of dollars which note holders and depositors have the right to draw out of a bank exceeds the number of dollars in the bank, they are apt to jump to the conclusion that behind some of the notes or deposit-liabilities there is nothing. Yet behind all these obligations there is always, in the case of a solvent bank, full value; if not actual dollars, at any rate *dollars' worth of property*. By no jugglery can the liabilities exceed the assets except in insolvency, and even in that case only nominally, for the *true* value of the liabilities ("bad debts") will only equal the *true* value of the assets behind them.

These assets, as already indicated, are largely the notes of merchants, although, so far as the theory of banking is concerned, they might be any property whatever. If they consisted in the ownership of real estate or other wealth in "fee simple," so that the tangible wealth which property always represents were clearly evident, all mystery would disappear. But the effect would not be different. Instead of taking grain, machines, or steel ingots on deposit, in exchange for the money lent, banks prefer to take interest-bearing notes of corporations and individuals who own, directly or indirectly, grain, machines, and steel ingots; and by the banking laws the banks are even compelled to take the notes instead of the ingots. The bank finds itself with liabilities which exceed its *cash* assets; but in either case the excess of liabilities is balanced by the possession of other assets than cash. In other words, the assets of the bank are the liabilities of business men. The ultimate basis of the entire credit structure is kept out of sight, but the basis exists. Indeed, we may say that banking in a sense causes this visible, tangible wealth to circulate. If the acres of a landowner, or the iron stoves of a stove dealer cannot circulate in literally the same way that gold dollars circulate, yet the landowner or stove dealer may give to the bank a note on which the banker may base bank notes or deposits; and these bank notes and deposits will circulate like gold dollars. Through banking, he who possesses wealth difficult to exchange can create a circulating medium. He has only to give his note, for which, of course, his property is liable, to a bank, get in return the right to draw, and lo! his comparatively unexchangeable wealth becomes liquid currency. To put it crudely, banking is a device for coining into dollars land, stoves, and other wealth that is not otherwise generally exchangeable.

It is interesting to observe that the formation of the great modern "*trusts*" has given a considerable impetus to deposit currency; for the securities of large corporations are

more easily used as a basis for bank loans than the stocks and bonds of small corporations or than partnership rights.

We began by regarding a bank as substantially a coöperative enterprise, operated for the convenience and at the expense of its depositors. But, as soon as it reaches the point of lending money to X, Y, and Z on time, while itself owing money on demand, it assumes toward X, Y, and Z and its cash depositors, risks which the depositors would be unwilling to assume. To meet this situation, the responsibility and expense of running the bank is taken by a third class of people, — stockholders, — who are willing to assume the augmented risk for the sake of the chance of profit. Stockholders, in order to guarantee the depositors against loss, put in some cash of their own. Their contract is, in effect, to make good any loss to depositors. Let us suppose that the stockholders put in $50,000, — $40,000 in cash and $10,000 in the purchase of a bank building. The accounts now stand: —

Assets		Liabilities	
Cash	$140,000	Due depositors	$150,000
Loans	100,000	Due note holders	50,000
Building	10,000	Due stockholders	50,000
	$250,000		$250,000

§ 3. Banking Limitations

We have seen that the assets must be adequate to meet the liabilities. We now observe that the form of the assets must be such as will insure meeting the liabilities promptly. Since the business of a bank is to furnish quickly available property (cash or credit) in place of the slower property of its depositors, it fails of its purpose when it is caught with insufficient cash. Yet it "makes money" partly by tying up its quick property, *i.e.* lending it out where it is less accessible. Its problem in policy is to tie up enough to increase its property, but not to tie up so much as to get tied up itself. So far as anything has yet been said to the contrary,

a bank might increase indefinitely its loans in relation to its cash or in relation to its capital. If this were so, deposit currency could be indefinitely inflated. There are limits, however, imposed by prudence and sound economic policy, on both these processes. Insolvency and insufficiency of cash must both be avoided. Insolvency is that condition which threatens when loans are extended with insufficient capital. Insufficiency of cash is that condition which threatens when loans are extended unduly relatively to cash. Insolvency is reached when the assets no longer cover the liabilities (to others than stockholders), so that the bank is unable to pay its debts at all. Insufficiency of cash is reached when, although the bank's total assets are fully equal to its liabilities, the actual cash on hand is insufficient to meet the needs of the instant, and the bank is unable to pay its debts *on demand*.

The less the ratio of the value of the stockholders' interests to the value of liabilities to others, the greater is the risk of insolvency; the risk of insufficiency of cash is the greater, the less the ratio of the cash to the demand liabilities. In other words, the leading safeguard against insolvency lies in a large capital and surplus, but the leading safeguard against insufficiency of cash lies in a large cash reserve. Insolvency proper may befall any business enterprise. Insufficiency of cash relates especially to banks in their function of redeeming notes and deposits.

Let us illustrate insufficiency of cash. In our bank's accounts as we left them there was a reserve of $140,000 of cash, and $200,000 of demand liabilities (deposits and notes). The managers of the bank may think this reserve of $140,000 unnecessarily large or the loans unnecessarily small. They may then increase their loans (extended to customers in the form of cash, notes, or deposit accounts) until the cash reserve is reduced, say to $40,000, and the liabilities due depositors and note holders increased to $300,000. If, under these circumstances, some depositor or note holder demands

$50,000 cash, immediate payment will be impossible. It is true that the assets still equal the liabilities. There is full value behind the $50,000 demanded; but the understanding was that depositors and note holders should be paid in *money* and *on demand*. Were this not a stipulation of the deposit contract, the bank might pay the claims thus made upon it by transferring to its creditors the promissory notes due it from its debtors; or it might ask the customers to wait until it could turn these securities into cash.

Since a bank cannot follow either of these plans, it tries, where insufficiency of cash impends, to forestall this condition by "calling in" some of its loans, or if none can be called in, by selling some of its securities or other property for cash. But it happens unfortunately that there is a limit to the amount of cash which a bank can suddenly realize. No bank could escape failure if a large percentage of its note holders and depositors should *simultaneously* demand cash payment. To keep its depositors in single file is part of its policy. The paradox of a panic is well expressed by the case of the man who inquired of his bank whether it had cash available for paying the amount of his deposit, saying, "If you can pay me, I don't want it; but if you can't, I do." Such was the situation in 1907 in Wall Street. All the depositors at one time wanted to be sure their money "was there." Yet it never *is* there all at one time.

Since, then, insufficiency of cash is so troublesome a condition, — so difficult to escape when it has arrived, and so difficult to forestall when it begins to approach, — a bank must so regulate its loans and note issues as to keep on hand a sufficient cash reserve, and thus prevent insufficiency of cash from even threatening. It can regulate the reserve by alternately selling securities for cash and loaning cash on securities. The more the loans in proportion to the cash on hand, the greater the profits, but the greater the danger also. In the long run a bank maintains its necessary reserve by means of adjusting the interest rate charged for loans. If

it has few loans, and a reserve large enough to support loans of much greater volume, it will endeavor to extend its loans by lowering the rate of interest. If its loans are large, and it fears too great demands on the reserve, it will restrict the loans by a high interest charge. Thus, by alternately raising and lowering the rate of interest, a bank keeps its loans within the sum which the reserve can support, but endeavors to keep them (for the sake of profit) as high as the reserve will allow.

The amount of reserve itself, however, must be proportioned to liabilities. If the sums owed to individual depositors are large, relatively to the total liabilities, the reserve should be proportionately large, since the action of a small number of depositors can deplete it rapidly. The reserve in a large city with great bank activity needs to be greater in proportion to its demand liabilities than in a small town with infrequent banking transactions. No absolute numerical rule can be given. Arbitrary ratios are often imposed by law. National banks in the United States, for instance, are required to keep a reserve for their deposits, varying according as they are or are not situated in certain cities designated by law as " reserve " cities, *i.e.* cities where national banks hold deposits of banks elsewhere. These reserves are all in defense of deposits. In defense of notes, on the other hand, no cash reserve is required, — that is, of national banks. True, the same economic principles apply to both bank notes and deposits, but the law treats them differently. The government chooses to undertake to redeem the national bank notes on demand.

This legal regulation of banking reserves, however, is not a necessary nor a normal development of banking. Banking may exist without government regulations at all.

§ 4. The Total Currency and its Circulation

The study of banking operations, then, discloses two species of currency: one, bank notes, belonging to the category of money; and the other, deposits, belonging outside of that category, but constituting an excellent substitute. Referring these to the larger category of goods, we have a threefold classification of goods: first, *money;* second, deposit-currency, or simply *deposits;* and third, all other *goods*. And by the use of these, there are six possible types of exchange: —

(1) Money against money,
(2) Deposits against deposits,
(3) Goods against goods,
(4) Money against deposits,
(5) Money against goods,
(6) Deposits against goods

For our purpose, only the last two types of exchange are important, for these constitute the *circulation of currency*. As to the other four, the first and third have been previously explained as "money changing" and "barter" respectively. The second and fourth are banking transactions: the second being such operations as the selling of drafts for checks or the mutual cancellation of bank clearings; and the fourth being such operations as the depositing or withdrawing of money, by depositing cash or cashing checks.

The analysis of the balance sheets of banks has prepared us for the inclusion of bank deposits or circulating credit in the equation of exchange. We shall still use M to express the quantity of actual money, and V to express the velocity of its circulation. Similarly, we shall now use M' to express the total deposits subject to transfer by check; and V', to express the average velocity of their circulation. The total value of purchases in a year is therefore no longer to be

measured by MV, but by $MV + M'V'$. The equation of exchange, therefore, becomes

$$MV + M'V' = \Sigma pQ.$$

Let us again represent the equation of exchange by means of a mechanical picture. In Figure 9, trade, as before, is represented on the right by the weight of a miscellaneous assortment of goods; and their average price by the distance to the right from the fulcrum, or the length of the arm on which this weight hangs. Again at the left,

FIG. 9.

money (M) is represented by a weight in the form of a purse, and its velocity of circulation (V) by its arm; but now we have a new weight at the left, in the form of a bank book, to represent the bank deposits (M'). The velocity of circulation (V) of these bank deposits is represented by its distance from the fulcrum or the arm at which the book hangs.

This mechanism makes clear the fact that the average price (right arm) increases with the increase of money or bank deposits and with the velocities of their circulation, and decreases with the increase in the volume of trade.

Recurring to the left side of the equation of exchange, or $MV + M'V'$, we see that in a community without bank deposits the equation reduces simply to MV, the formula of Chapter VIII; for in such a community the term $M'V'$ vanishes.

§ 5. Deposit Currency Normally Proportional to Money

With the extension of the equation of monetary circulation to include deposit circulation, the influence exerted by

the quantity of money on general prices becomes less direct; and the process of tracing this influence becomes more difficult and complicated. It has even been argued that this interposition of circulating credit breaks whatever connection there may be between prices and the quantity of money. This would be true if circulating credit were independent of money. But the fact is, as we have seen, that the quantity of circulating credit, M', tends to hold a definite relation to M, the quantity of money in circulation, — that is, deposits are normally a more or less definite multiple of money.

Two facts normally give deposits a more or less definite ratio to money. The first has been already explained, viz. that bank reserves are kept in a more or less definite ratio to bank deposits. The second is that individuals, firms, and corporations preserve more or less definite ratios between their cash transactions and their check transactions, and also between their money and deposit balances. These ratios are determined by motives of individual convenience and habit. In general, business firms use money for wage payments, and for small miscellaneous transactions included under the term "petty cash"; while for settlements with each other they usually prefer checks. These preferences are so strong that we could not imagine them overridden except temporarily and to a small degree. A business firm would hardly pay car fares with checks and liquidate its large liabilities with cash. Each person strikes an equilibrium between his use of the two methods of payment, and does not greatly disturb it except for short periods of time. He keeps his stock of money or his bank balance in constant adjustment to the payments he makes in money or by check. Whenever his stock of money becomes relatively small and his bank balance relatively large, he cashes a check. In the opposite event, he deposits cash. In this way he is constantly converting one of the two media of exchange into the other. A private individual usually feeds his purse from his bank account; a retail commercial firm usually feeds its

bank account from its till. But for both these depositors the bank acts as intermediary.

In a given community the quantitative relation of deposit currency to money is determined by several considerations of convenience. In the first place, the more highly developed the business of a community, the more prevalent the use of checks. Where business is conducted on a large scale, merchants habitually transact their larger operations with each other by means of checks, and their smaller transactions by means of cash. Again, the more concentrated the population, the more prevalent the use of checks. In cities it is more convenient both for the payer and the payee to make large payments by check; whereas, in the country, trips to a bank are too expensive in time and effort to be convenient, and therefore more money is used in proportion to the amount of business done. Again, the wealthier the members of the community, the more largely will they use checks. Laborers seldom use them; but capitalists, professional and salaried men use them habitually, for personal as well as business transactions.

There is, then, a relation of convenience and custom between check and cash circulation, and a more or less stable ratio between the deposit balance of the average man or corporation and the stock of money kept in pocket or till. This fact, as applied to the country as a whole, means that by convenience a rough ratio is fixed between M and M'. If that ratio is disturbed temporarily, there will come into play a tendency to restore it. Individuals will deposit surplus cash, or they will cash surplus deposits.

Hence, both money in circulation (as just shown) and money in reserve (as shown previously) tend to keep in a fixed ratio to deposits. It follows that the two must be in a fixed ratio to each other. As to the adjustment or ratio of bank reserves to bank deposits, this evidently varies for different banks. In the United States a reserve is required by law, and the ratio insisted on differs according as the

banks are ordinary national banks, national banks in reserve cities, or in central reserve cities, state banks, private banks, or trust companies. But even were there no legal requirement, experience would doubtless dictate differently the average size of deposit accounts for different banks according to the general character and amount of their business. For every bank there is a normal ratio, and hence for a whole community there is also a normal ratio, — an average of the ratios for the different banks.

§ 6. Summary

The contents of this chapter may be formulated in a few simple propositions : —

(1) Banks supply two kinds of currency, viz. bank notes — which are money ; and bank deposits (or rights to draw) — which are not money.

(2) A bank check is merely a certificate of a right to draw.

(3) Behind the claims of depositors and note holders stands not simply the cash reserve but all the assets of the bank.

(4) Deposit banking is a device by which wealth, incapable of direct circulation, may be made the basis of the circulation of rights to draw.

(5) The basis of such circulating rights to draw or deposits must consist in part of actual money, and it *should* consist in part also of quick assets readily exchangeable for money.

(6) Six sorts of exchange exist among three classes of goods, money, deposits, and other goods. Of these six sorts of exchange, the most important for our present purposes are the exchanges of money and deposits against goods.

(7) The equation of money circulation extended so as to make it include bank deposits reads thus: $MV + M'V' = \Sigma pQ$.

(8) The relation of bank deposits (M') to the quantity of money (M) has already been discussed, and we have seen that there must exist between bank deposits and money a normal ratio; because, in the first place, cash reserves are necessary to support bank deposits, and these reserves must bear some more or less constant ratio to the amount of such deposits; and because, in the second place, business convenience dictates that the available currency shall be apportioned between deposits and money in a certain more or less definite, even though elastic, ratio.

CHAPTER X

THE EQUATION OF EXCHANGE DURING TRANSITION PERIODS

§ 1. The Tardiness of Interest Adjustment to Price Movements

In the last chapter it was shown that the quantity of bank deposits normally maintains a definite ratio to the quantity of money in circulation and to the amount of bank reserves. As long as this normal relation holds, the existence of bank deposits merely *magnifies* the effect on the level of prices produced by the quantity of money in circulation and does not in the least *distort* that effect. Moreover, changes in velocity or trade will have the same effect on prices, whether bank deposits are included or not.

But during periods of transition this relation between money (M) and deposits (M') is by no means rigid.

We are now ready to study these periods of transition. The change which constitutes a transition may be a change in the quantity of money, or in any other factor of the equation of exchange, or in all. Usually all are involved, but the chief factor which we shall select for study (together with its effects on the other factors) is quantity of money. If the quantity of money were suddenly doubled, the effect of the change would not be the same at first as later. The ultimate effect is, as we have seen, to double prices; but before this happens, the prices oscillate up and down. In this chapter we shall consider the *temporary effects during the period of transition* separately from the *permanent or ultimate effects* which were considered in the last chapter. These permanent or ultimate effects follow after a new equilibrium is established, — if, indeed, such a condition as equilibrium may

ever be said to be established. What we are concerned with in this chapter is the temporary effects, *i.e.* those in the transition period.

The transition periods may be characterized either by rising prices or by falling prices. *Rising* prices must be clearly distinguished from *high* prices, and *falling* from *low*. With stationary levels, high or low, we have in this chapter nothing to do. Our concern is with rising or falling prices. Rising prices mark the transition between a low and a high level of prices, just as a hill marks the transition between flat lowlands and flat highlands. Since the study of these acclivities and declivities is bound up with that of the adjustment of interest rates, our first task is to present a brief statement regarding the effects of rising and falling prices on the rate of interest. Indeed, the chief object of this chapter is to show that the peculiar behavior of the rate of interest during transition periods is largely responsible for the crises and depressions in which price movements end.

It must be borne in mind that although business loans are made in the form of money, yet whenever a man borrows money he does not do this in order to hoard the money, but to purchase goods with it. To all intents and purposes, therefore, when A borrows one hundred dollars from B in order to purchase, say, one hundred units of a given commodity at one dollar per unit, it may be said that B is virtually lending A one hundred units of that commodity. And if at the end of a year A returns one hundred dollars to B, but the price of the commodity has meanwhile advanced, then B has lost a fraction of the purchasing power originally loaned to A. For even though A should happen to return to B the identical coins in which the loan was made, these coins represent somewhat less than the original quantity of purchasable commodities. Bearing this in mind in our investigation of interest rates, let us suppose that prices are rising at the rate of 3 per cent each year. It is plain that the man who lends $100 at the beginning of the year, must, in order to get

5 per cent interest in purchasing power, receive back both $103 (then the equivalent of the $100 lent) plus 5 per cent of this, or a total of $108.15. That is, in order to get 5 per cent interest in *actual purchasing power*, he must receive a little more than 8 per cent interest in *money*. The 3 per cent rise of prices thus adds approximately 3 per cent to the rate of interest. Rising prices, therefore, in order that the relations between creditor and debtor shall be the same during the rise as before and after, require higher money interest than stationary prices require. Not only will lenders demand higher interest in terms of money, but borrowers can afford to pay it; and to some extent competition will gradually force them to do so. Yet we are so accustomed in our business dealings to consider money as the one thing stable, — to think of a " dollar as a dollar " regardless of the passage of time, — that we reluctantly yield to this process of readjustment, thus rendering it very slow and imperfect. When prices are rising at the rate of 3 per cent a year, and the normal rate of interest, *i.e.* the rate which would exist were prices stationary, is 5 per cent, the actual rate, though it ought (in order to make up for the rising prices) to be 8.15 per cent, will not ordinarily reach that figure; but it may reach, say, 6 per cent, and later, 7 per cent. This inadequacy and tardiness of adjustment, is fostered, moreover, by law and custom, which arbitrarily tend to keep down the rate of interest, even though, at the prevailing rate, the demand for money exceeds the supply. A similar inadequacy of adjustment is observed when prices are falling. Suppose that, by the end of a year, $97 will buy as much as $100 at the beginning. In that case the lender, in order to get back a purchasing power equivalent to his principal and 5 per cent interest, should get, not $105, but only $97 + 5 per cent of $97 or $101.85. Thus the rate of interest in money should in this case be 1.85 per cent or less than 2 per cent. In other words, the 3 per cent fall of prices should reduce the rate of interest by approximately 3 per cent. But as a

matter of fact, such a perfect adjustment is seldom reached, and money interest keeps far above 2 per cent for a considerable time.

§ 2. How a Rise of Prices generates a Further Rise

We are now ready to study temporary or transitional changes in the factors of our equation of exchange. Let us begin by assuming a slight initial disturbance, such as would be produced, for instance, by an increase in the quantity of gold. This will cause a rise in prices. The rate of interest will not respond immediately. As prices rise, profits of business men measured in money will rise also, even if the costs of business rise in the same proportion. Thus, if a man who sold $10,000 of goods at a cost of $6000, thus clearing $4000, can get double prices at double cost, his profit will be double also, being $20,000 − $12,000, which is $8000. Of course such a rise of prices is purely nominal, as it merely keeps pace with the rise in price level. The business man gains no advantage, for his larger money profits will buy no more than his former smaller money profits bought. But if among his costs is interest, and this cost does not rise, the profits will rise faster than prices. Consequently, he will find himself making greater profits than usual, and be encouraged to expand his business by increasing his borrowings. These borrowings are mostly in the form of short-time loans by banks; and, as we have seen, short-time loans are in the form of deposits. Therefore, deposit currency (M') will increase, but this extension of deposit currency tends further to raise the general level of prices, just as the increase of gold raised it in the first place. Hence prices, which were already outstripping the rate of interest, tend to outstrip it still further, enabling borrowers, who were already increasing their profits, to increase them still further. Borrowing, already stimulated, is stimulated still further; more loans are demanded, and although nominal interest may be forced up

somewhat, still it keeps lagging below the normal level. Yet nominally, the rate of interest *has* increased; and hence the lenders too, including banks, are led to become more enterprising. Led by the higher nominal rates into the belief that fairly high interest is being realized, they extend their loans, and with the resulting expansion of bank loans, deposit currency (M'), already expanded, expands still more. Hence prices rise still further. This sequence of events may be briefly stated as follows: —

1. Prices rise (whatever the first cause may be, but we have chosen for illustration an increase in the amount of gold.)
2. The rate of interest rises, but not sufficiently.
3. Enterpriser-borrowers, encouraged by large profits, expand their loans.
4. Deposit currency (M') expands relatively to money (M).
5. Prices continue to rise, that is, phenomenon No. 1 is repeated.

Then No. 2 is repeated, and so on.

In other words, a slight initial rise of prices sets in motion a train of events which tends to repeat itself. Rise of prices generates rise of prices, and continues to do so as long *as the interest rate lags behind its normal figure.*

§ 3. How a Rise of Prices culminates in a Crisis

The expansion in deposit currency indicated in this cycle of events abnormally increases the ratio of M' to M.

This, however, is not the only disturbance caused by the increase in M. There are disturbances in the Q's, in V, and in V'. These will be taken up in order. Trade (the Q's) will be stimulated by the easy terms for loans. This effect is always noted during rising prices, and people note approvingly that "business is good" and "times are booming." Such statements represent the point of view of the ordinary

business man who is an "enterpriser-borrower." They do not represent the sentiments of the creditor, the salaried man, or the laborer, most of whom are silent but long-suffering — paying higher prices but not getting proportionally higher incomes.

The increase in business on the one hand and the increase in deposits on the other hand do not exactly offset each other, as experience abundantly proves. The increase in deposits will outweigh the increase in trade. This becomes evident when we consider that the added deposits found their origin in loans that were intended to finance new operations. Usually the added trade for which the deposit was created requires the expenditure of that deposit only once. But the deposit once created is apt to last a long time. After it is spent by the men who created it, it goes to swell the deposit accounts of others. It is like new gold coin which, after the gold miner has once put it into circulation, continues in circulation indefinitely. The gold miner may expend it for mining expenses which help to make a demand for the new coins it brings into circulation, but the new gold will be used more than once; and for all uses beyond the first, no new transactions have been especially created for its continued expenditure. The new deposit currency likewise, when once originated by the loan for new business, does not thereafter find enough "new work" to do to keep it busy. That is, the new deposit currency (M') adds more to the left side of the equation than the trade which gave it birth adds to the right side. Consequently, the net effect is to increase the price level.

We next observe that the rise in prices — fall in the purchasing power of money — will accelerate the circulation of money. We all hasten to get rid of any commodity which, like ripe fruit, is spoiling on our hands. Money is no exception. When it is depreciating, holders will get rid of it as fast as possible. As they view it, their motive is to buy goods which appreciate in terms of money. The inevitable

result is that these goods rise in price still further. The series of changes, then, initiated by rising prices, expressed more fully than before, is as follows: —

1. Prices rise.
2. Velocities of circulation (V and V') increase; the rate of interest rises, but not sufficiently.
3. Loans expand and the Q's increase.
4. Deposit currency (M') expands relatively to money (M).
5. Prices continue to rise; that is, phenomenon No. 1 is repeated.

Then No. 2 is repeated, and so on.

It will be noticed that these changes now involve all magnitudes in the equation of exchange. They are temporary changes, pertaining only to the transition period. They are like temporary increases in power and readjustments in the position of an automobile climbing a hill.

Evidently the expansion coming from this cycle of causes cannot proceed forever. It must ultimately spend itself. The check upon its continued operation lies in the rate of interest. It was the tardiness of the rise in interest that was responsible for the abnormal condition. But the rise in interest, though belated, is progressive, and, as soon as it overtakes the rate of rise in prices, the whole situation is changed. If prices are rising at the rate of 2 per cent per annum, the boom will continue only until interest becomes 2 per cent higher. It then offsets the rate of rise in prices. The banks are forced in self-defense to raise interest because they cannot stand so abnormal an expansion of loans relatively to reserves. As soon as the interest rate becomes adjusted, borrowers can no longer hope to make great profits, and the demand for loans ceases to expand.

There are also other forces resisting further expansion of deposit currency and tending to contraction. But those above mentioned are the most important.

With the rise of interest, those who have counted on re-

newing their loans at the former rates and for the former amounts are unable to do so. Some of them are destined to fail. The failure (or prospect of failure) of firms that have borrowed heavily from banks induces fear on the part of many depositors that the banks will not be able to realize on these loans. Hence, the banks themselves fall under suspicion, and for this reason depositors demand cash. Then occur " runs on the banks," which deplete the bank reserves at the very moment they are most needed. Being short of reserves the banks have to curtail their loans. It is then that the rate of interest rises to a panic figure. Those who are caught *must* have currency to liquidate their obligations, and to get it are willing to pay high interest. Some of them are destined to become bankrupt, and, with their failure, the demand for loans is correspondingly reduced. This culmination of an upward price movement is what is called a crisis, — a condition characterized by bankruptcies, and the bankruptcies being due to a lack of cash when it is most needed.

Then a curious thing happens: borrowers, unable to get easy loans, blame the high rate of interest for conditions which were really due to the fact that the previous rate of interest was not high enough. Had the previous rate been high enough, they never would have overinvested.

§ 4. Completion of the Credit Cycle

The contraction of loans and deposits, and the decrease in velocities, prevent a further rise of prices and tend toward a fall. The crest of the wave is reached and a reaction sets in. Since prices have stopped rising, the rate of interest, which has risen to compensate the rise of prices, *should* fall again. But, just as at first it was slow to rise, so now it is slow to fall. In fact, it tends for a time to rise still further. Even when interest begins to fall, it falls slowly, and failures continue to occur. Borrowers now find that interest, though nomi-

nally low, is still hard to meet. Bank loans tend to be low, and consequently deposits (M') are reduced. The contraction of deposit currency makes prices fall still more. Those who have borrowed for the purpose of buying stocks of goods, now find they cannot sell them for enough to pay back what they have borrowed. Owing to this tardiness of the interest rate to fall to a lower and a normal level, the sequence of events is now the opposite of what it was before: —

1. Prices fall.
2. The rate of interest falls, but not sufficiently.
3. Enterpriser-borrowers, discouraged by small profits, contract their borrowings.
4. Deposit currency (M') contracts relatively to money (M).
5. Prices continue to fall; that is, phenomenon No. 1 is repeated.

Then No. 2 is repeated, and so on.

Thus a fall of prices generates a further fall of prices. The cycle evidently repeats itself as long as the rate of interest lags behind. The man who loses most is the business man in debt. He is the typical business man, and he now complains that "business is bad." There is a "depression of trade."

During this depression velocities (V and V') are abnormally low. People are less hasty to spend money or check- when the dollars they represent are rising in purchasins power. Also trade (the Q's) declines. A statement including these factors is: —

1. Prices fall.
2. Velocities of circulation (V and V') fall; the rate of interest falls, but not sufficiently.
3. Loans and the Q's decrease.
4. Deposit currency (M') contracts relatively to money (M).
5. Prices continue to fall; that is, phenomenon No. 1 is repeated.

Then No. 2 is repeated, and so on.

The contraction brought about by this cycle of causes becomes self-limiting as soon as the rate of interest overtakes the rate of fall in prices. After a time, normal conditions begin to return. The weakest producers have been forced out, or have at least been prevented from expanding their business by increased loans. The strongest firms are left to build up a new credit structure. Borrowers again become willing to take ventures. Failures decrease in number. Bank loans cease to decrease. Prices cease to fall. Borrowing and carrying on business becomes profitable; loans are again demanded; prices again begin to rise, and there occurs a repetition of the upward movement already described.

The upward and downward movements taken together constitute a complete credit cycle, which resembles the forward and backward movements of a pendulum.

We have considered the rise, culmination, fall, and recovery of prices. These changes are abnormal oscillations, due to some initial disturbance. In most cases the time occupied by the swing of the commercial pendulum to and fro is about ten years. While the pendulum is continually seeking a stable position, practically there is almost always some occurrence to prevent perfect equilibrium. Oscillations are set up which, though tending to be self-corrective, are continually perpetuated by fresh disturbances. The factors in the equation of exchange are therefore continually seeking normal adjustment. A ship in a calm sea will "pitch" only a few times before coming to rest. But in a high sea the pitching never ceases. While continually seeking equilibrium, the ship continually encounters causes which accentuate the oscillation.

CHAPTER XI

INFLUENCES OUTSIDE THE EQUATION

§ 1. Influences which Conditions of Production exert on Trade and therefore on Prices

THUS far we have considered the level of prices as affected by the volume of trade, by the velocity of circulation of money and of deposits, and by the quantity of money and of deposits. These are the only influences which can directly affect the level of prices. Any other influences on prices must act through these three. There are myriads of such influences (outside of the equation of exchange) that affect prices through the medium of these three. It is our purpose in this chapter to note the chief among them, excepting those that affect the volume of money (M); the latter will be examined in the next chapter.

We shall first consider the outside influences that affect the volume of trade and through it the price level. The conditions which determine the extent of trade are numerous and technical. The most important may be classified as follows: —

1. *Conditions affecting producers.*
   - (*a*) Geographical differences in natural resources.
   - (*b*) The division of labor.
   - (*c*) Knowledge of the technique of production.
   - (*d*) The accumulation of capital.
2. *Conditions affecting consumers.*
   - (*a*) The extent and variety of human wants.

3. *Conditions connecting producers and consumers.*
   (*a*) Facilities for transportation.
   (*b*) Relative freedom of trade.
   (*c*) Character of monetary and banking systems.
   (*d*) Business confidence.

1. (*a*) It is evident that if all localities were exactly alike in their natural resources and in other comparative costs of production, no trade would be set up between them. It is equally true that the greater the difference in the costs of production of different articles in different localities, the more likely is there to be trade between them, and the greater the amount of that trade. Primitive trade had its *raison d'être* in the fact that the regions of this earth are unlike in their products. The traders were travelers between distant countries. Changes in commercial geography still produce changes in the distribution and volume of trade. The exhaustion of the gold and silver mines in Nevada and of lumber in Michigan have tended to reduce the volume of trade of these regions, both external and internal. Contrariwise, cattle raising in Texas, the production of coal in Pennsylvania, of oranges in Florida, and of apples in Oregon, has increased the volume of trade for these communities respectively.

1. (*b*) Equally obvious is the influence of the division of labor, *i.e.* the differentiation of productive activity among men. *Division of labor* is based in part on difference in comparative costs as between men, — corresponding to geographic differences as between countries. These two combined lead to local differentiation of labor, making, for example, the town of Sheffield famous for cutlery, Dresden for china, Venice for glass, Patterson for silks, and Pittsburg for steel.

1. (*c*) Besides local and personal differentiation, the state of knowledge of production will stimulate trade. The mines of Africa and Australia were left unworked for centuries by

ignorant natives, but were opened by white men possessing a knowledge of metallurgy. Vast coal fields in China await development, largely for lack of knowledge of how to extract and market the coal. Egypt awaits the advent of scientific agriculture to usher in trade expansion. Nowadays, trade schools in Germany, England, and the United States are increasing and diffusing knowledge of productive technique.

1. (*d*) But knowledge, to be of use, must be applied; and its application usually requires the aid of capital. The greater and the more productive the stock of capital in any community, the more goods it can put into the channels of trade. A mill will make a town a center of trade. Docks, elevators, warehouses, and railway terminals, help to transform a harbor into a port of commerce.

Since increase in trade tends to decrease the general level of prices; anything which tends to increase trade likewise tends to decrease the general level of prices. We conclude, therefore, that among the causes tending to decrease prices are: increasing geographical or personal specialization; improved productive technique; and the accumulation of capital.

2. (*a*) Turning to the consumer's side, it is evident that their wants change from time to time. This is true even of so-called natural wants, but more conspicuously true of acquired or artificial wants.

Wants are, as it were, the mainsprings of economic activity which in the last analysis keep the economic world in motion. The desire to have clothes as fine as the clothes of others, or finer, or different, leads to the multiplicity of silks, satins, laces, etc.; and the same principle applies to furniture, amusements, books, works of art, and every other means of gratification.

The increase of wants, by leading to an increase in trade, tends to lower the price level.

§ 2. Influence of Conditions connecting Producers and Consumers on Trade and therefore on Prices

3. (*a*) Anything which facilitates intercourse tends to increase trade. Anything that interferes with intercourse tends to decrease trade. First of all should be mentioned the mechanical facilities for transport. As Macaulay said, with the exception of the alphabet and the printing press, no set of inventions has tended to alter civilization so much as those which abridge distance, — such as the railway, the steamship, the telephone, the telegraph, and that conveyer of information and advertisements, the newspaper. These all tend to increase trade and therefore to decrease prices.

3. (*b*) Trade barriers are not only physical but legal. A tariff between countries has the same influence in decreasing trade as a chain of mountains. The freer the trade, the more of it there will be. In France, many communities have a local tariff ("octroi") which tends to interfere with local trade. In the United States, trade is free within the country itself, but between the United States and other countries there is a high protective tariff. The very fact of increasing facilities for transportation, lowering or removing physical barriers, has stimulated nations and communities to erect *legal* barriers in their place. Tariffs not only tend to decrease the frequency of exchanges, but, to the extent that they prevent international or interlocal division of labor and make countries more alike as well as less productive, they also tend to decrease the amounts of goods which can be exchanged. The ultimate effect is thus to raise prices.

3. (*c*) The development of efficient monetary and banking systems tends to increase trade. There have been times in the history of the world when the money was in so uncertain a state that people hesitated to make many trade contracts because of the lack of knowledge of what would be required

of them when the contract should be fulfilled. In the same way, when people cannot depend on the good faith or stability of banks, they will hestitate to use deposits and checks.

3. (*d*) Confidence, not only in banks in particular but in business contracts in general, is truly said to be "the soul of trade." Without confidence there cannot be a great volume of contracts. Anything that tends to increase this confidence tends to increase trade. In South America there are many places waiting to be developed simply because capitalists do not feel any security in contracts there. They are fearful that by hook or by crook the fruit of any investments they may make will be taken from them.

We see, then, that prices will tend to fall through an increase in trade, which may in turn be brought about by improved transportation, by increased freedom of trade, by improved monetary and banking systems, and by business confidence.

The external trade of any country is intimately connected with its internal trade. An increase of the former may cause an increase in the latter. Industry planted in any locality for the purpose of trading with distant localities will bring with it all kinds of supplementary commerce, so that the locality will become a market for many sorts of goods.

Through the various causes mentioned, trade has been increasing for centuries; and the history of civilization is largely the history of increasing trade. The discovery of new lands, the specialization of their products, division of labor, invention, and the improvement of industrial technique, the accumulation of capital, increased complexity of human wants, cheapened transportation and communication, development of better monetary and banking systems, and greater confidence, have, in spite of higher tariff walls, worked toward lower price levels; and the future promises a still further expansion of trade.

§ 3. Influence of Individual Habits on Velocities of Circulation and therefore on Prices

Our next task is to consider those causes outside of the equation of exchange that affect the velocities of circulation of money and of deposits. For the most part, the causes affecting one of these also affect the other. These causes may be classified as follows: —

1. *Habits of the individual.*
   (*a*) As to thrift and hoarding.
   (*b*) As to book credit.
   (*c*) As to the use of checks.

2. *Systems of payments in the community.*
   (*a*) As to frequency of receipts and of disbursements.
   (*b*) As to regularity of receipts and of disbursements.
   (*c*) As to correspondence between times and amounts of receipts and of disbursements.

3. *General causes.*
   (*a*) Density of population.
   (*b*) Rapidity of transportation.

1. (*a*) Taking these up in order, we may first consider what influence thrift has on the velocity of circulation. Velocity of money is the same thing as the rate of turnover of money. It was found by dividing the total payments effected by money in a year by the amount of money in circulation in that year. It depends upon the rates of turnover of the individuals which compose the society. This velocity of circulation or rapidity of turnover of money is the greater for each individual the more he spends with a given average amount of cash on hand or the less average cash he keeps for a given yearly expenditure. Great is the velocity of circulation of a spendthrift. He tends to be "short" of

funds — to have a small average balance on hand. But his thrifty neighbor takes care to provide himself with cash enough to meet all contingencies. The latter tends to hoard and lay by his money, and will therefore have a slower velocity of circulation. When, as used to be the custom in France, people put money away in stockings and kept it there for months, the velocity of circulation must have been extremely slow. The same principle applies to deposits. Oftentimes in a certain university town the banks either refuse to take deposits from students of spending habits because the average balances of the latter are so low, or insist on a special stipulation that the balances shall never fall below one hundred dollars.

Hoarded money is sometimes said to be withdrawn from circulation. This is only another way of saying that hoarding tends to decrease the velocity of circulation.

A man who is thrifty is usually to some extent a hoarder either of money or of bank deposits. Laborers who save keep their savings, usually in the form of money, until enough is accumulated to be deposited in a savings bank. Those who have bank accounts will likewise accumulate considerable deposits when preparing to make an investment. Banks whose depositors are "rapidly making money" and periodically investing the same, have, it is said, less active accounts than banks whose depositors "live up to their incomes."

1. (*b*) The habit of "charging," or book credit, tends to *increase* the velocity of circulation of money, because the man who gets things "charged" does not need to *keep on hand* as much money as he would if he made all payments in cash. A man who daily pays *cash* needs to keep cash for daily contingencies. The system of cash payments, unlike the system of book credit, requires that money shall be kept on hand *in advance* of purchases. Evidently, if money must be provided in advance, it must be provided in larger quantities than when merely required to liquidate past debts. In

the system of cash payments a man must keep money idle *in advance*, lest he be caught in the embarrassing position of lacking it when he most needs it. With book credit he knows that even if he should be caught without a cent in his pocket, he can still get supplies on credit. These he can pay for when money comes to hand. Moreover, this money need not lie long in his pocket. Immediately it is received, there is a use awaiting it to pay debts accumulated. For instance, a laborer receiving and spending $7 a week, if he cannot " charge," must make his week's wages last through the week. If he spends $1 a day, his weekly cycle must show on successive days at least as much as $7, $6, $5, $4, $3, $2, and $1, at which time another $7 comes in. This makes an average of at least $4. But if he can charge everything, and then wait until pay day to meet the resulting obligations, he need keep nothing through the week, paying out his $7 when it comes in. His weekly cycle need show no higher balances than $7, $0, $0, $0, $0, $0, $0, the average of which is only $1.

Through book credit, therefore, the average amount of money or bank deposits which each person must keep at hand to meet a given expenditure is made less. This means that the rate of turnover is increased.

1. (*c*) The habit of using checks, rather than money, will also affect the velocity of circulation, because a depositor's surplus money will immediately be put in the bank in return for a right to draw by check.

Banks thus offer an outlet for any surplus pocket money or surplus till money, and thus tend to prevent the existence of idle hoards. In like manner, surplus deposits may be converted into cash — that is, exchanged for cash — as desired. In short, those who make use both of cash and deposits may, by adjusting the two, prevent either from being idle.

We see, then, that these habits — spendthrift habits, the habit of charging, and the habit of using checks — all tend

to raise the level of prices through their effects on the velocity of circulation, of money, or of deposits. It is believed that these habits (except probably the first) have been increasing rapidly during modern times.

§ 4. Influence of Systems of Payments on Velocities of Circulation and therefore on Prices

2. (*a*) The more frequently money or checks are received and disbursed, the shorter is the average interval between the receipt and the expenditure of money or checks, and the more rapid is the velocity of circulation.

This may best be seen from an example. A change from monthly to weekly wage payments tends to increase the velocity of circulation of money. If a laborer is paid weekly $7, and reduces this evenly each day, ending each week empty-handed, his average cash on hand will be a little over half of $7, or about $4. This makes his rate of turnover nearly twice a week. Under monthly payments, the laborer who receives and spends an average of $1 a day will have to spread the $30 evenly over the following 30 days. If, at the next pay day, he comes out empty-handed, his average money during the month has been $15. This makes his turnover nearly twice a month. Thus the rate of turnover is more rapid under weekly than under monthly payments.

The same result would hold if we assumed that, instead of ending the cycle empty-handed, he ended it with a given fraction — say half — of his wages unspent. Under weekly payments, he would begin with $10.50, and end with $3.50, averaging about $7. Under monthly payments he would thus begin with an average of $45, and end with $15, averaging about $30. In the former case his average velocity of circulation would be once a week, and in the latter once a month. The turnover would still be about four times as rapid under weekly as under monthly payments. Thus, if the distribution of expenditure over the two cycles should

have exactly the same "time shape" (distribution in time), weekly payments would accelerate the velocity of circulation in the same ratio which a month bears to a week. As a matter of history, however, we cannot be sure whether the substitution of weekly payments has increased the rapidity of circulation of money among workingmen four-fold, because the change in another element, book credit, would be likely to cause a somewhat compensatory decrease. Book credit is more likely to be used under monthly than under weekly payments. Where this book-credit habit or habit of "charging" is prevalent, the great bulk of money is spent on pay day. It is probable that the substitution of weekly for monthly payments, when it has taken place, has enabled many workingmen, who formerly found it necessary to trade on credit, to make their own payments in cash, thus decreasing the velocity of turnover of money.

Frequency of disbursements evidently has an effect similar to the effect of frequency of receipts; *i.e.* it tends to accelerate the velocity of turnover, or circulation.

2. (*b*) *Regularity* of payment also facilitates the turnover. When the workingman can be fairly certain of both his receipts and expenditures, he can, by close calculation, adjust them so precisely as safely to end each payment cycle with an empty pocket. This habit is extremely common among certain classes of city laborers. On the other hand, if the receipts and expenditures are irregular, either in amount or in time, prudence requires the worker to keep a larger sum on hand to insure against mishaps. Even when foreknown with certainty, irregular receipts require a larger average sum to be kept on hand. We may therefore conclude that regularity of receipts and of payments tends to increase velocity of circulation.

2. (*c*) Next, consider the synchronizing of receipts and disbursements, *i.e.* making payments at the same intervals as obtaining receipts. It is manifestly a great convenience to the spender of money or of deposits, if dealers to whom

he is in debt will allow him to postpone payment until he has received his money or his check. This arrangement obviates the necessity of keeping much money or deposits on hand, and therefore increases their velocity of circulation. Where payments such as rent, interest, insurance, and taxes, occur at periods irrespective of the times of receipts of money, it is often necessary to accumulate money or deposits in advance, thus increasing the average on hand, withdrawing money from use for a time, and decreasing the velocity of circulation.

We conclude, then, that synchronizing and regularity of payment, no less than frequency of payment, have tended to increase prices by an increasing velocity of circulation. The change from monthly to weekly payments of workmen has been progressing rapidly, and in many states has been made mandatory by law. So far as these factors have operated, therefore, there has been a tendency for prices to rise.

§ 5. Influence of General Causes on Velocities of Circulation and Indirectly on Price Levels

3. (*a*) The more densely populated a locality, the more rapid will be the velocity of circulation, because there will be readier access to people from whom money is received or to whom it is paid. In the country, although there are no statistics, the velocity of circulation must be much slower than in the city. A lady who has a city house and a country house states that in the country she keeps money in her purse for weeks, whereas in the city she keeps it but a few days. Pierre des Essars has worked out the velocity of circulation at banks in many European cities. Examination of his figures reveals the fact that in almost all cases the larger the town in which the bank is situated, the more active the deposits.

3. (*b*) Again, the more extensive and the speedier the transportation facilities, in general the more rapid the circu-

lation of money. Anything which makes it easier to pass money from one person to another will tend to increase the velocity of circulation. Railways have this effect. The telegraph has increased the velocity of circulation of deposits, since these can now be transferred thousands of miles in a few minutes. Mail and express, by facilitating the transmission of bank deposits and money, have likewise tended to increase their velocity of circulation.

We conclude, then, that density of population and rapidity of transportation have tended to increase prices by increasing velocities.

§ 7. Influences on the Volume of Deposit Currency and therefore on Prices

We have to consider lastly the specific outside influences on the volume of deposits subject to check.

These are chiefly: —

(1) The system of banking and the habits of the people in utilizing that system.

(2) The habit of " charging."

(1) It goes without saying that a banking system must be devised and developed before it can be used. The invention of banking has made deposit currency possible, and its adoption has undoubtedly led to a great rise of prices.

(2) " Charging " is often a preliminary to payment by check rather than by cash. If a customer did not have his obligations " charged," he would pay in money and not by check. The ultimate effect of this practice, therefore, is to increase the ratio of check payments to cash payments and the ratio of deposits to money carried, therefore to increase the amount of credit currency which a given quantity of money can sustain. This effect, the substitution of checks for cash payments, is probably by far the most important effect of " charging," and exerts a powerful influence toward raising prices.

CHAPTER XII

OUTSIDE INFLUENCES CONTINUED

§ 1. Influence of "The Balance of Trade" on the Quantity of Money

We have now considered those influences outside the equation of exchange which affect the volume of trade (the Q's), the velocities of circulation of money and deposits (V and V'), and the amount of deposits (M'). We have reserved for separate treatment in this chapter the outside influences that affect the quantity of money (M).

The chief of these may be classified as follows: —

1. Influences operating through the exportation and importation of money.
2. Influences operating through the melting or minting of money.
3. Influences operating through the production and consumption of money metals.
4. Influences produced by prevailing monetary and banking systems.

1. The first to be considered is the influence of foreign trade. Hitherto we have confined our studies of price level to an isolated community, having no trade relations with other communities. In the modern world, however, no such community exists, and it is important to observe that international trade gives present-day problems of money and of the price level an international character. If all countries had their own irredeemable paper money, and no money that was acceptable elsewhere, there could be no international adjustment of monetary matters. Price levels in different countries would have no intimate connection.

Indeed, to some extent the connection is actually broken between existing countries which have different metallic standards, — for example, between a gold-basis and a silver-basis country, — although through their non-monetary uses the two metals are still somewhat bound together, as any two substitutes, or partial substitutes, are bound together. But where two or more nations trading with each other use the *same* standard, there is a tendency for the price levels of each to influence profoundly the price levels of the other.

The price level in Switzerland depends largely upon the price level in other countries. Gold, which is the basic or full weight money in most civilized nations, is constantly traveling from one country or community to another. When a single small country is under consideration, it is therefore preferable to say that the quantity of money in that country is determined by the universal price level, rather than to say that its level of prices is determined by the quantity of money within its borders. An individual country bears the same relation to the world that a lagoon bears to the ocean. The level of the ocean depends, of course, upon the quantity of water in it. But when we speak of the lagoon we reverse the statement, and say that the quantity of water in it depends upon the level of the ocean. As the tide in the outside ocean rises and falls, the quantity of water in the lagoon will adjust itself accordingly.

To simplify the problem of the distribution of money among different communities, we shall, for the time being, ignore the fact that money consists ordinarily of material capable of non-monetary uses. We shall likewise, for the present, omit consideration of the production of money through mining.

Let us, then, consider the causes that determine the quantity of money in a state like Connecticut. If the level of prices in Connecticut temporarily falls below that of

the surrounding states, Rhode Island, Massachusetts, and New York, the effect is to cause an export of money from these states to Connecticut, because people will buy goods wherever they are cheapest and sell them wherever they are dearest. With its low prices, Connecticut becomes a good place to buy from, but a poor place to sell to. But if outsiders buy of Connecticut, they will have to bring money to buy with. There will, therefore, be a tendency for money to flow to Connecticut until the level of prices there rises to a level which will arrest the influx. If, on the other hand, prices in Connecticut are higher than in surrounding states, it becomes a good place to sell to and a poor one to buy from. But if outsiders sell to Connecticut, they will receive money in exchange. There is then a tendency for money to flow out of Connecticut until the level of prices in Connecticut is lower. In general, money flows away from places where the level of prices is high, and towards places where it is low. Men sell goods where they can get most money, and buy goods where they will have to give least money. We say "money," for in the long run we do not need to consider the interflow of any other currency than money; as we have seen, in the long run deposit currency will maintain a definite ratio to money.

But it must not be inferred that the prices of various articles, or even the general level of prices, will become precisely the same in all countries. Distance, ignorance as to where the best markets are to be found, tariffs, and costs of transportation, help to maintain price differences. The native products of each region tend to be cheaper in that region. They are exported as long as the excess of prices abroad is enough to more than cover the cost of transportation. Practically a commodity will not be exported at a price which will not at least be equal to the price in the country of origin, plus the freight. Many commodities are shipped only one way. Thus, wheat is shipped from the United States to England, but not from England to the

United States. It is produced in the United States, and tends to be cheaper here. Large exportations raise its price in America toward the price in England, but it will usually keep below that price by the cost of transportation. Other commodities that are cheap to transport will be sent in either direction, according to market conditions.

But, although international and interlocal trade will never bring about exact uniformity of price levels, it will produce an adjustment of these levels toward uniformity by regulating, in the manner already described, the distribution of money. If one commodity enters into international trade, it will suffice to act as a regulator of money distribution; for, in return for that commodity, money may flow, and as the price level rises or falls, the quantity of that commodity sold may be correspondingly adjusted. In ordinary intercourse between nations, even when a deliberate attempt is made to interfere with it by protective tariffs, there will always be a large number of commodities thus acting as outlets and inlets. And since the *quantity of money itself* affects prices for *all* sorts of commodities, the regulative effect of international trade applies not simply to the commodities which enter into that trade, but to all. It follows that nowadays international and interlocal trade is constantly regulating price levels throughout the world.

We must not leave this subject without emphasizing the effects of a tariff on the purchasing power of money. When a country adopts a tariff, the tendency is for the level of prices to rise. A tariff obviously raises the prices of the "protected" goods. But it does more than that — it tends also to raise the prices of *un*protected goods. Thus, the tariff first causes a decrease in imports. Though in the long run this decrease in imports will lead to a corresponding decrease in exports, yet at first there will be no such adjustment. The foreigner will, for a time, continue to buy from the protected country almost as much as before.

This will result temporarily in an excess of that country's exports over its imports, or a so-called "favorable" balance of trade, and a consequent inflow of money. This inflow will eventually raise the prices not alone of protected goods but of unprotected goods as well. The rise will continue till it reaches a point high enough to put a stop to the "favorable" balance of trade.

Although the "favorable balance" of trade created by a tariff is temporary, it leaves behind a permanent increase of money and of prices.

This is perhaps the chief reason why a protective tariff seems to many a cause of prosperity. It furnishes a temporary stimulus not only to protected industries but to trade in general, which is really simply a stimulus of money inflation.

Our present interest in international trade, however, is mainly directed to its effects on international price levels. Except for the export or import of money to adjust the price levels, international trade is at bottom merely an interchange of goods. The "goods" entering into international trade include not only the visible exports and imports, but also securities, services of carrying vessels conducting the trade, and in fact any wealth, property, or services exchanged.

We have shown how the international and interlocal equilibrium of prices may be disturbed by differential changes only in the quantity of money. But it may be disturbed by differential changes also in the volume of bank deposits; or in the velocity of circulation of money; or in the velocity of circulation of bank deposits; or in the volume of trade. And whatever may be the source of the difference in price levels, equilibrium will eventually be restored through an international or interlocal redistribution of money and goods brought about by international and interlocal trade. Other elements in the equation of exchange than money and commodities can not be transported from one place to another.

§ 2. Influence of melting and minting on the Quantity of Money

We have seen how M in the equation of exchange is affected by the import or export of money. Considered with reference to the M in any one of them, the M's in all the others are "outside influences."

Proceeding now one step farther, we must consider those influences on M that are not only outside of any equation of exchange for a particular country but outside those for the whole world. Besides the monetary inflow and outflow through import and export, there is an inflow and outflow through minting and melting. In other words, not only do the stocks of money in the world connect with each other like interconnecting bodies of water, but they connect in the same way with the outside *stock of bullion*. In the modern world one of the precious metals, — such as gold or silver, — usually plays the part of primary money, and this metal has two uses, — a monetary use and a commodity use. That is to say, gold or silver is not only a money-material but a commodity as well. In their character of commodities, the precious metals are raw materials for jewelry, works of art, and other products into which they may be wrought. It is in this unmanufactured or raw state that they are called bullion. Now gold money, for example, may be changed into gold bullion, and *vice versa*. In fact, both changes are going on constantly, for if the value of gold as compared with other commodities is greater in the one use than in the other, gold will immediately flow toward whichever use is more profitable, and the market price of gold bullion will determine the direction of the flow. Since 100 ounces of gold, $\frac{9}{10}$ fine, can be transformed into $1860, the market value of so much gold bullion, $\frac{9}{10}$ fine, must tend to be $1860. If it costs nothing to have bullion coined into money, and nothing to melt money into bullion, there will be an automatic flux and reflux from money to bullion

and from bullion to money that will prevent the price of bullion from varying greatly. On the one hand, if the price of gold bullion is greater than the money which could be minted from it, no matter how slight the difference may be, the users of gold who require bullion — notably jewelers — will save this difference by melting gold coin into bullion. Contrariwise, if the price of bullion is less than the value of gold coin, the owners of bullion will save the difference by taking bullion to the mint and having it coined into gold dollars, instead of selling it in the bullion market. The effect of melting coin, on the one hand, is to decrease the amount of gold money and increase the amount of gold bullion, thereby lowering the value of gold as bullion and raising the value of gold as money; thereby lowering the price level and restoring the equality between bullion and money. The effect of minting bullion into coin is by the opposite process to bring the value of gold as coin and the value of gold as bullion again into equilibrium.

Where a charge — called *seigniorage* — is made for changing bullion into coin, or where the process involves expense or delay, the flow of bullion into currency will be, to that extent, impeded. But under a modern system of free coinage and with modern methods of metallurgy, both melting and minting may be performed so inexpensively and so quickly that there is practically no cost and no delay involved. In fact, there are few instances of more exact price adjustment than the adjustment between gold bullion and gold coin. It follows that the quantity of money, and therefore its purchasing power, is directly dependent on that of gold bullion.

This stability of the price of gold bullion expressed in gold coin causes confusion in the minds of people, giving them the erroneous impression that there is no change in the value of money. Indeed, this stability has often been cited to show that gold is a stable standard of value. Dealers in objects made of gold seem to misunder-

stand the significance of the fact that an ounce of gold always costs about $18.60 in the United States or £3, 17*s.*, and 10½ *d.* in England. This means nothing more than the fact that gold in one form and measured in one way will always bear a constant ratio to gold in another form and measured in another way. An ounce of gold bullion is worth a fixed number of gold dollars, for the same reason that a pound sterling of gold is worth a fixed number of dollars, or that a gold eagle is worth a fixed number of dollars.

Except, then, for extremely slight and temporary fluctuations, gold bullion and gold money must always have the same value. Therefore in the following discussion respecting the more considerable fluctuations affecting both, we shall speak of both interchangeably as " the value of gold."

§ 3. Influence of the Production and Consumption of Money Metals on the Quantity of Money

The stock of bullion is not the ultimate outside influence on the quantity of money. As the stock of bullion and the stock of money influence each other, so the total stock of both is itself influenced by production and consumption. The production of gold consists of the output of the mines — which constantly tends to add to the existing stocks both of bullion and coin. The consumption of gold consists of the use of bullion in the arts by being wrought up into jewelry, gilding, etc., and of losses by abrasion, shipwreck, etc. If we consider the amount of gold coin and bullion as a reservoir, production would be the inflow (from the mines), and consumption the outflow to the arts and by destruction and loss. To the inflow from the mines should be added the *re*-inflow from forms of art into which gold had previously been wrought but which have grown obsolete, illustrated by the business of producing gold bullion by burning old picture frames.

We shall consider first the inflow or production, and afterward the outflow or consumption. The regulator of the inflow (which practically means the production of gold from the mines) is its estimated cost of production. Wherever the estimated cost of producing a dollar of gold is less than the existing value of a dollar in gold, it will normally be produced. Wherever the cost of production exceeds the existing value of a dollar, gold will normally not be produced. In the former case the production of gold is profitable; in the latter it is unprofitable.

This holds true, in whatever way cost of production is measured — whether in terms of gold itself, or in terms of some other commodity such as wheat, or of commodities in general, or of any supposed " absolute " standard of value. In gold-standard countries gold miners do actually reckon the cost of producing gold in terms of gold. From their standpoint it is a needless complication to translate the cost of production and the value of the product into some other standard than gold. They are interested in the relation between the two, and this relation will not be affected by the standard.

To illustrate how the producer of gold measures everything in gold, suppose that the price level rises. He will then have to pay more dollars for wages, machinery, fuel, etc., while the prices obtained for his *product* (expressed in those same dollars) will, as always, remain unchanged. Conversely, a fall in the price level will lower his cost of production (measured in dollars), while the price of his product will still remain the same. Thus we have a *constant* number expressing the price of gold product and a *variable* number expressing its cost of production. If we express the same phenomena, not in terms of gold but in terms of wheat, or rather, let us say, in terms of goods in general, we shall have the opposite conditions.

Of course the comparison is the same, whether we use gold or other commodities as our criterion. In the one

view, a rise of prices means a rise in the gold miner's cost of production; in the other it means a fall in the price (purchasing power) of his product. In either view he will be discouraged. *He* will look at his troubles in the former light, *i.e.* as a rise in the cost of production; but we shall find it more useful to look at them in the latter, *i.e.* as a fall in the purchasing power of the product. The cost of production in either case is compared with the purchasing power of gold. If this purchasing power is above the cost of production in any mine, it will pay to work that mine. If the purchasing power of gold is lower than the cost of production of any mine, it will not pay to work that mine. Thus the production of gold increases or decreases with an increase or decrease in the purchasing power of money.

So much for the inflow of gold and the conditions regulating it. We turn next to outflow or consumption of gold. This has two aspects, viz. consumption in the arts and consumption for monetary purposes.

If objects made of gold are cheap, — that is, if the prices of other things are relatively high, — then the relative cheapness of the gold objects will lead to an increase in their use. Or, expressing the matter in terms of money prices, when people find prices of everything else higher and their own incomes likewise higher, while gold watches and gold ornaments generally remain at their old level, they can afford to buy more gold watches and ornaments.

These are instances of the consumption of gold in the form of commodities. The consumption of gold as coin is a matter of abrasion, of waste and wear. It changes with the changes in the amount of gold in use and in its rapidity of exchange. The important result is that an increase in the price (purchasing power) of a gold dollar encourages the production of gold and discourages its consumption just as an increase in the price of any other commodity encourages its production and discourages its consumption. A decrease, of course, acts in the opposite way. The pur-

chasing power of money, being thus played upon by the opposing forces of production and consumption, is driven up or down as the case may be.

§ 4. Mechanical Illustration of these Influences

In any complete picture of the forces determining the purchasing power of money we need to keep prominently in view three groups of factors: (1) the production or the "inflow" of gold (*i.e.* from the mines); (2) the consumption or "outflow" (into the arts and by destruction and loss); and (3) the "stock" or reservoir of gold (whether coin or bullion) which receives the inflow and suffers the outflow. The relations among these three sets of magni-

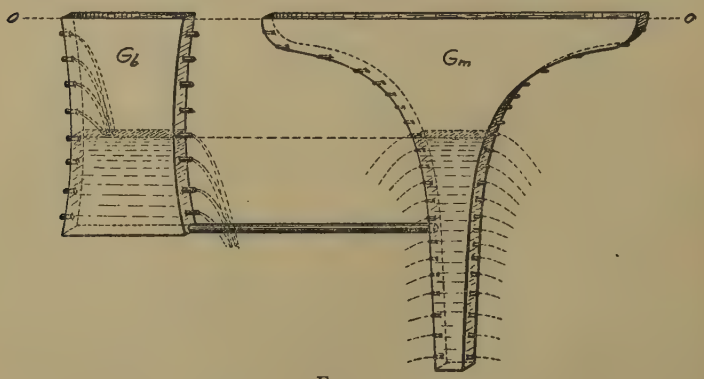


FIG. 10.

tudes can be set forth by means of a mechanical illustration, given in Figure 10. This represents two connected reservoirs of water, G_b and G_m. The contents of the first reservoir represent the stock of gold bullion, and the contents of the second the stock of gold money. Since purchasing power increases with scarcity, the distance from the top of the cisterns, *OO* to the surface of the liquid is taken to represent the purchasing power of gold over other goods. A lowering of the level of the liquid in G_m indicates an in-

crease in the purchasing power of money, since we measure this purchasing power downward from the line *OO* to the surface of the liquid. We shall not attempt to represent other forms of currency explicitly in the diagram. We have seen that normally the quantities of other currency are proportional to the quantity of primary money, which we are supposing to be gold. Therefore the variation in the purchasing power of this primary money may be taken as representative of the variation of all the currency. We shall now explain the *shapes* of these cisterns. The shape of the cistern G_m must be such as will make the distance of the liquid surface below *OO* decrease with an increase of the liquid, *in exactly the same way as the purchasing power of gold decreases with an increase in its quantity*. That is, as the quantity of liquid in G_m doubles, the distance of the surface from the line *OO* should decrease by one half. In the same way for gold bullion, the shape of the cistern must be such as will make the distance of the liquid surface below *OO* decrease with an increase of the liquid in the same way as the value of gold bullion decreases with the stock of gold bullion. The shapes of the two cisterns need not, and ordinarily will not, be the same.

Both reservoirs have inlets and outlets. Let us consider these in connection with the bullion reservoir (G_b). Here each inlet represents a particular mine supplying bullion, and each outlet represents a particular use in the arts consuming gold bullion. Each mine and each use has its own distance from *OO*. There are, therefore, three sets of distance from *OO*: the inlet distances, the liquid surface distance, and the outlet distances. Each inlet distance represents the cost of production, measured in goods for each mine; each outlet distance represents the value of gold in each particular use in goods. The surface distance, as we have already explained, represents the value of bullion, likewise measured in goods, — in other words, its purchasing power.

It is evident that among these three sets of levels there will be discrepancies. These discrepancies serve to interpret the relative state of things as among mines, bullion, and uses of gold at any given moment, and will determine the various flows — in and out. If an inlet at a given moment be above the surface-level, *i.e.* at a less distance from *OO*, the interpretation is that the cost of production is less than the purchasing power of the bullion. Hence the mine owner will turn on his spigot and keep it on until, perchance, the surface-level rises to the level of his mine, — *i.e.* until the surface-distance from *OO* is as small as the inlet-distance — *i.e.* until the purchasing power of bullion is as small as the cost of production. At this point there is no longer any profit in mining. So much for inlets ; now let us consider outlets. If an outlet at a given moment be below the surface-level, — *i.e. at a greater distance from OO*, — the interpretation is that the value of gold in that particular use is greater than the purchasing power of bullion. Hence gold bullion will flow into these uses where its worth is greater than as bullion. That is, it will flow out of all outlets *below* the surface in the reservoir.

It is evident, therefore, that at any given moment, only the inlets above the surface-level, and only the outlets below it, will be called into operation. As the surface rises, therefore, more outlets will be brought into use, but fewer inlets. That is to say, the less the purchasing power of gold as bullion, the more it will be used in the arts, but the less profitable it will be for the mines to produce it, and the smaller will be the output of the mines. As the surface falls, more inlets will come into use and fewer outlets.

We turn now to the money reservoir (G_m). The outlets from this reservoir represent the consumption of gold coins by loss and abrasion. These increase with increase of the stock of coins. The fact that gold has the same value either as bullion or as coin, because of the interflow between them, is interpreted in the diagram by connecting the

bullion and coin reservoirs, in consequence of which both will (like water) have the same level. The surface of the liquid will in both cases be the same distance below the line *OO*, and this distance represents the value of gold. Should the inflow at any time exceed the outflow, the result will necessarily be an increase in the stock of gold in existence. This will tend to decrease the purchasing power or value of gold. But as soon as the surface rises, fewer inlets and more outlets will operate. That is, the excessive inflow on the one hand will decrease, and the deficient outflow or consumption on the other hand will increase, checking the inequality between the outflow and inflow. If, on the other hand, the outflow should temporarily be greater than the inflow, the reservoir will tend to become less full. The purchasing power will increase; thus the excessive outflow will be checked, and the deficient inflow stimulated, — restoring equilibrium. The exact point of equilibrium may seldom or never be realized, but as in the case of a pendulum swinging back and forth *through* a position of equilibrium, there will always be a tendency to seek it.

It need scarcely be said that our mechanical diagram is intended merely to give a picture of some of the chief variables involved in the problem under discussion. It does not of itself constitute an argument, or add any new element; nor should one pretend that it includes explicitly *all* the factors which need to be considered. But it does enable us to grasp the chief factors involved in determining the purchasing power of money. It enables us to observe and trace the following important variations and their effects: —

First, if there be an increased production of gold or improved methods of working old ones, — due, let us suppose, to the discovery of new mines, — this may be represented by an increase in the number or size of the inlets into the G_b reservoir; the result will evidently be an increase of "inflow" into the bullion reservoir, and from that into the currency reservoir, a consequent gradual fill-

ing up of both, and therefore a decrease in the purchasing power of money. This process will be checked finally by the increase in consumption. And when production and consumption become equal, an equilibrium will be established. An exhaustion of gold mines obviously would operate in exactly the reverse manner.

Secondly, if there be an increase in the consumption of gold, — as through some change of fashion, — it may be represented by an increase in the number or size of the outlets of G_b. The result will be a draining out of the bullion reservoir, and consequently a decreased amount in the currency reservoir; hence an increase in the purchasing power of gold, which increase will be checked finally by an increase in the output of the mines as well as by a decrease in consumption. When the increased production and the decreased consumption become equal, equilibrium will again be reached.

If the connection between the currency reservoir and the bullion reservoir is closed by a valve so that gold cannot flow from bullion into money (although it can flow in the reverse direction), then the purchasing power of the gold as money may become greater than its value as bullion. Whatever increase may take place in the production of gold will then tend only to fill the bullion reservoir and decrease the distance of the surface from the line *OO*, *i.e.* lower the value of gold bullion. The surface of the liquid in the money reservoir will not be brought nearer *OO*. It may even be lowered farther away. In other words, the purchasing power of money will be entirely independent of the value of the bullion out of which it was first made.

We have now discussed all but one of the outside influences upon the equation of exchange. That one is the character of the monetary and banking system which affects the quantity of money and deposits. This we reserve for special discussion in the following two chapters. Meanwhile we may here summarize such of those influences dis-

cussed in this and the preceding chapter as operate *in more than one way*. Consider, for instance, technical knowledge and invention, which affect the equation of exchange by increasing trade. So far as these increase trade, the tendency is to decrease prices; but so far as they develop metallurgy and the other arts tending to increase the production and easy transportation of the precious metals, they tend to *increase* prices. So far as they make the transportation and transfer of money and deposits quicker, they also tend to increase prices. So far as they lead to the development of the art of banking, they likewise tend to increase prices, both by increasing deposit currency (M') and by increasing the velocity of circulation both of money and deposits. So far as they lead to the concentration of population in cities, they tend to increase prices by accelerating circulation.

Finally, so far as per capita trade is increased through this or any other cause, there is a tendency to increase the velocity of circulation of money. What the net effect may be during any given period will depend on the predominant direction in which the arts are developed.

It is also noteworthy that almost all of the influences affecting either the quantity or the velocities of circulation have been and are predominantly in the direction of higher prices. Almost the only opposing influence is the increased volume of trade; but this is largely neutralized by increased velocities due to the increased trade itself, and by the progressive increase and concentration of population, which helped to bring about the increase of trade.

CHAPTER XIII

OPERATION OF MONETARY SYSTEMS

§ 1. Gresham's Law

Thus far we have considered the influences that determine the purchasing power of money when the money in circulation is all of one kind. The illustration given in the previous chapter shows how the money mechanism operates when a single metal is used as the primary money and is freely minted and melted. We have now to consider the monetary systems in which more than one metal enjoys this status, beginning with the most familiar system, — that of bimetallism.

One of the first difficulties in the early history of money was that of keeping two (or more) metals in circulation. One of the two would become cheaper than the other, and the cheaper would drive out the dearer.

To this tendency has been given the name of " Gresham's Law " in honor of Sir Thomas Gresham, a financial adviser of Queen Elizabeth of England. It was he who propounded it in the middle of the sixteenth century. But the law seems to have been recognized among the ancient Greeks. It is mentioned in the " Frogs " of Aristophanes: —

" For your old and standard pieces, valued and approved and tried,
Here among the Grecian nations and in all the world beside
Recognized in every realm for trusty stamp and pure assay,
Are rejected and abandoned for the trash of yesterday;
For a vile, adulterate issue, drossy, counterfeit and base
Which the traffic of the City passes current in their place! "

Gresham's Law is ordinarily stated in the form, " Bad money drives out good money," for it was usually observed

that the badly worn, defaced, light-weight, "clipped," "sweated," and otherwise deteriorated money tended to drive out the full-weight, freshly minted coins. This formulation, however, is not accurate. It is not true that "*bad*" coins, *e.g.* worn, bent, defaced, or even clipped coins will drive out other money just because of their worn, bent, defaced, or clipped condition. Accurately stated, the law is simply this: *Cheap money will drive out dear money.* The reason why, of two moneys, the cheaper always prevails, is that the choice of the use of money rests chiefly with the man who gives it in exchange, not with the man who receives it. When any one has the choice of paying his debts in either of two moneys, motives of economy will prompt him to use the cheaper. If the initiative and choice lay principally with the person who receives instead of the person who pays the money, the opposite would hold true. The dearer or "good" money would then drive out the cheaper or "bad" money. It is because the debtor exercises the choice that the cheaper money tends to continue in circulation. What becomes of the dearer money? It may be hoarded, or go into the melting pot, or go abroad — hoarded and melted from motives of economy, and sent abroad because, where foreign trade is involved, it is the foreigner who receives the money rather than ourselves who give it that dictates what kind of money shall be accepted. He will take only the best, because our legal-tender laws do not bind him.

Gresham's Law applies not only to two rival moneys of the same metal — it applies to all moneys that circulate concurrently. Until "milling" the edges of coins was invented, and a "limit of tolerance" of the mint (deviation from the standard weight) was adopted, much embarrassment was felt in commerce from the fact that the clipping and debasing of coin was a common practice. Nowadays, however, any coin which has been so "sweated" or clipped as to reduce its weight appreciably ceases to be legal tender,

and being commonly rejected by those to whom it is offered, ceases to be money. Within the customary or legal limits of tolerance, however, — that is, as long as the cheaper money retains the "money" power, — it will still drive out the dearer.

§ 2. When Bimetallism Fails

The obvious effect of Gresham's Law is to decrease the purchasing power of money at every opportunity. The history of the world's currencies is largely a record of money debasements, often at the behest of the sovereign. Our chief purpose now, in considering Gresham's Law, is to formulate more fully the causes determining the purchasing power of money under monetary systems subject to the operation of Gresham's Law. The first application is to bimetallism.

In order to understand fully the influence of any monetary system on the purchasing power of money, we must first understand how the system works. It has been denied that bimetallism ever did work or can be made to work, because the cheaper metal will drive out the dearer. Our first task is to show, quite irrespective of its desirability, that bimetallism can and does "work" under certain circumstances, but not under others. To make clear when it will work and when it will not work, we shall continue to employ the mechanical illustration of the last chapter, in which the amount of gold bullion is represented by the contents of reservoir G_b (Figs. 11, 12). Here, as before, we represent the purchasing power or value of gold by the distance of the water level below the zero level *OO*. Now, in the last chapter, our figure represented only one metal, gold, and represented that metal in two reservoirs — the bullion reservoir and the coin reservoir. We shall now, a step at a time, elaborate that figure. First, as in Figure 11 *a*, we add a reservoir for silver bullion (S_b), a reservoir of somewhat

different shape and size from G_b. This reservoir might be used to show the relation between the value or purchasing power of silver and its quantity in the arts and as bullion. Here, then, are three reservoirs. At first the silver one is entirely isolated; but after a while we shall connect it with the middle one. For the present let us suppose that the middle one, which contains money, is entirely filled with gold money only (Fig. 11 *a*), no silver being yet used as money. In other words, the monetary system is the same as that discussed in the last chapter. The only change we have introduced is to add to the picture another reservoir (S_b), entirely detached, showing the quantity and value of silver bullion.

We next suppose a pipe opened at the right, connecting S_b with the money reservoir, that is, we introduce bimetallism. Under bimetallism, governments open their mints to the free coinage of both metals at a fixed ratio, *i.e.* a fixed ratio between the said metals. For instance, if a silver dollar contains 16 grains of silver for every grain of gold in a gold dollar, the ratio is said to be 16 to 1. Under this system, the debtor has the option, unless otherwise bound by his contract, of making payment either in gold or in silver money. These, in fact, are the two requisites of complete bimetallism, viz.: (1) the free and unlimited coinage of both metals at a fixed ratio, and (2) the unlimited legal tender of each metal at that ratio. These new conditions are represented in Figure 11 *b* (and later, Fig. 12 *b*), where a pipe gives silver an opening into the money or central reservoir.

What we are about to represent is not the relations between mines, bullion, and arts, but the relations between bullion (two kinds) and coins. We may therefore disregard for the present all inlets and outlets except the connections between the bullion reservoirs and coin reservoir.

Now in these reservoirs the surface-distances below *OO* represent, as we have said, purchasing power. Purchasing

power of what? Of gold and of silver, yes; but each unit of silver (say each drop of silver water, whether as money or as bullion) contains 16 times as many grains as each unit of gold (say drop of gold water, whether as money or as bullion). We all know, of course, that a silver dollar is much larger than a gold dollar. But for the sake of our

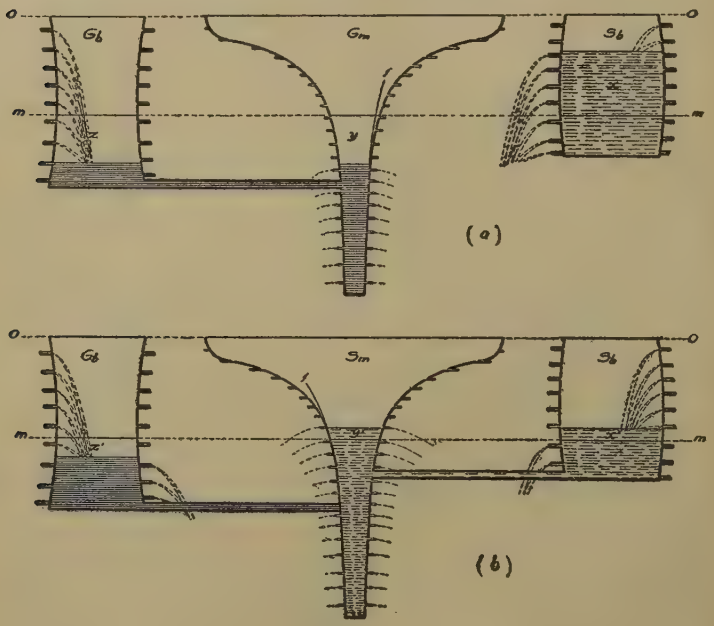


FIG. 11.

mechanical representation we may disregard this difference, and regard a drop of gold (whether money or bullion) as occupying equal space with a drop of silver (money or bullion). That is, a unit of water represents a dollar of gold or a dollar of silver. All we wish to represent is the relative purchasing power of corresponding units.

The waters representing gold and silver money are separated by a movable film *ff*. In Figure 11 *a* this film is at

the extreme right, in Figure 11 *b*, at the extreme left, in Figure 12 *a*, again at the right, and in Figure 12 *b*, midway. The *a* figures represent conditions *before* the mints are opened to silver. The *b* figures represent conditions *after* they have been opened and Gresham's law has operated. If, just previous to the introduction of bimetallism, the silver level is below the gold level, the statute introducing bimetallism will be inoperative, *i.e.* the silver bullion will not flow into the money reservoir; but if, as in Figure 11 *a* or 12 *a* the silver level is higher, then as soon as the mints are open to silver, it will flow into circulation. Being at first cheaper than gold, it will push out the gold. This expulsion of gold may be complete, as shown in Figure 11 *b*, or only partial, as shown in Figure 12 *b*. The expulsion will continue just as long as there is a premium on gold; that is, as long as the silver level in the bullion reservoir is above the gold level in the money reservoir; *i.e.* as long as silver bullion is cheaper than gold money.

Let *mm*, as shown in Figure 11 *a*, be the mean level; that is, a level such that the volume x above it equals the combined vacant volumes y and z below it. This line *mm* remains the mean level, whatever may be the distribution of the contents among the three reservoirs. As soon as the connecting pipe is inserted, silver will flow into the money reservoir and, in accordance with Gresham's Law, will displace gold.

Here we have to distinguish two cases: (1) when the silver x above the mean line *mm exceeds the contents of the money reservoir below this line;* (2) when x is less than said lower contents. In the first case, it is evident that silver will sweep gold wholly out of circulation, as shown in Figure 11 *b* where the film *ff* has moved from the extreme right to the extreme left. The contents of silver in the bullion reservoir are less than before, and the contents of gold in the bullion reservoir greater than before.

But this redistribution is only the first effect of opening

the mints to silver. The balance between production and consumption has been upset both for gold and for silver. The increased value of silver (lowered level in S_b) has stimulated production, bringing into operation silver mines (uncovered inlets at right); and, on the other hand, the decreased value of gold (raised level in G_b) has discouraged gold production, shutting off gold mines (covered inlets at left). Like alterations are effected in the outflows, *i.e.* the consumption, waste, and absorption of each metal. The result is that the levels resulting from the first redistribution will not necessarily be permanent. Under the influence of production and consumption, they may, and under ordinary conditions will, recede somewhat toward their original respective positions.

§ 3. When Bimetallism Succeeds

So much for the first case, where x is larger than the contents of the money reservoir below *mm*. In the second case, x is supposed to be smaller than the contents of the money reservoir below *mm*; that is, there is not enough silver to push *all* the gold out of circulation. Under these circumstances the opening of the pipe — the opening of the mints to silver — will bring the whole system of liquids to the common level *mm*. In other words, the premium on gold bullion will disappear (Fig. 12 *b*), and its purchasing power and the purchasing power of silver bullion will be a mean between their original purchasing powers, this mean being the distance of the mean line *mm* below *OO*. In other words, bimetallism succeeds in this case. That is, it will establish and maintain an equality for a time between the gold and silver dollars in the money reservoir.

The equilibrium we have found is a mere equalization of levels produced by a redistribution of the *existing* stocks of gold and silver among the various reservoirs. It will be disturbed as soon as these stocks are disturbed. A per-

manent equilibrium requires that the stocks shall remain the same — requires, in other words, an equality between production and consumption for each metal. After the inrush of silver, from the silver bullion to the money reservoir, it is evident that the production and consumption of gold need no longer be equal to each other, nor need the

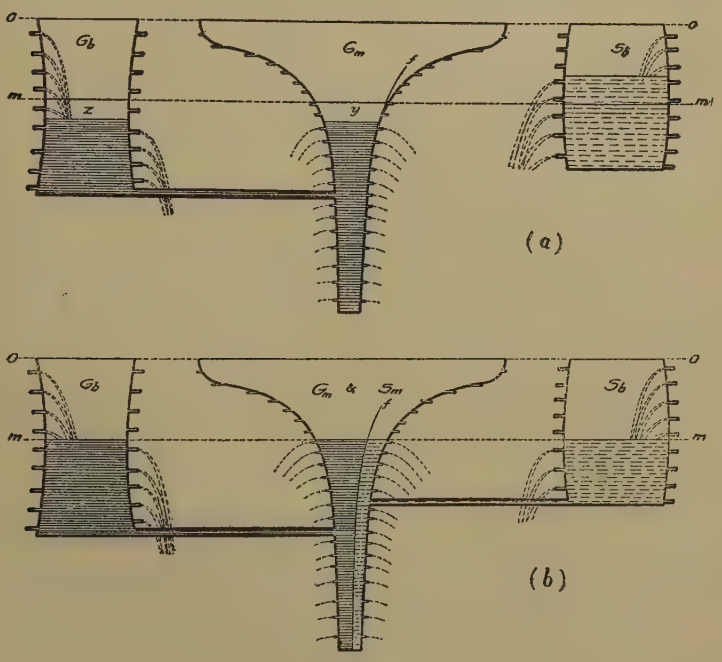


FIG. 12.

production and consumption of silver be equal to each other. The same stimulation of silver production and discouragement of gold production will occur that occurred in the first case. The result may be that, after all, silver will, in the end, entirely displace gold, or again it may not. If a position of the film be found at which the production and consumption of gold are equal to each other, and the pro-

duction and consumption of silver are likewise equal to each other, there will be equilibrium. This equilibrium may be upset later and the film driven to the right or the left as new gold or silver is discovered and flows into the system of reservoirs from one side or the other. But bimetallism will continue to keep gold and silver dollars equivalent until the film happens sometime to be driven to either extreme position. Such a fate is in the end altogether probable. Then the two kinds of dollars diverge in value and only the cheaper metal remains as money.

§ 4. The "Limping" Standard

Bimetallism is to-day a subject of historical interest only. It is no longer practiced. But its former prevalence has left behind it in many countries, including France and the United States, a monetary system which is sometimes called the "limping" standard. Such a system results when, in a system of straight bimetallism, before either metal can wholly expel the other, the mint is closed to one of them, but the coinage that has been accomplished up to date not recalled. Suppose silver to be the metal thus excluded, — as in France and the United States. Any money already coined in that metal and in circulation is kept in circulation at par with gold. This parity may continue even if *limited* additional amounts of silver be coined from time to time. There will then result a difference in value between silver bullion and silver coin, the silver coin being overvalued. This situation is represented in Figure 13. Here the pipe connection between the money reservoir and the silver-bullion reservoir has been, as it were, cut off — or, let us say, stopped by a valve which refuses passage of silver into the money reservoir, but does not prevent passage from the money reservoir to the bullion reservoir; for no law ever can prevent the melting down of silver coins into bullion. Newly mined silver cannot now become money, and thus

lower the purchasing power of the money. On the other hand, new supplies of gold continue to affect the value of the currency, as before, not only of the gold but also of the concurrently circulating overvalued silver. If more gold should flow into the money reservoir, it would raise the currency level. Should this level ever become higher than the level of the silver bullion reservoir, silver would flow from the money reservoir into the bullion reservoir; for the passage *in that direction* (*i.e.* melting) is still free. So long, however, as the currency level is below the silver level,

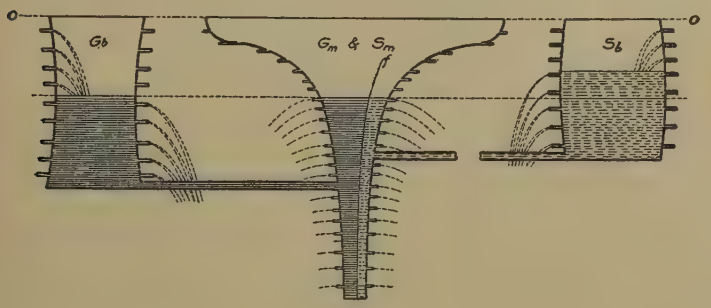


FIG. 13.

i.e. so long as the coined silver is worth more than the uncoined, there will be no flow of silver in either direction. The legal prohibition prevents the flow in one direction, and the laws of relative levels prevent its flow in the other.

In the case just discussed, the value of the coined silver will be equal to the value of gold at the legal ratio. Precisely the same principle applies in the case of any money the coined value of which is greater than the value of its constituent material. Take the case, for instance, of paper money. So long as it has the distinctive characteristic of money, — general acceptability at its legal value, — and is limited in quantity, its value will ordinarily be equal to that of its legal equivalent in gold. If its quantity increases indefinitely, it will gradually push out all the gold

and entirely fill the money reservoir, just as silver would do under genuine bimetallism if produced in sufficiently large amounts. Credit money and credit in the form of bank deposits have this effect. To the extent that they are used, they lessen the demand for gold, decrease its value as money, and cause more of it to go into the arts or to other countries.

So long as the quantity of silver or other token money, *e.g.* paper money, is too small to displace gold completely, gold will continue in circulation. The value of the other money in this case cannot fall below that of gold. For if it should, it would by Gresham's Law displace gold, which we have supposed it is not of sufficient quantity to do. The parity between silver coin and gold coin, under the " limping " standard, is therefore not necessarily dependent on any redeemability in gold, but may result merely from limitation in the amount of silver coin. Such limitation is usually sufficient to maintain parity despite irredeemability. This is not always true, however; for if the people should lose confidence in some form of irredeemable paper or token money, even though it were not overissued, it would depreciate and be nearly as cheap as money is in the raw state. A man is willing to accept money at its face value so long as he has confidence that every one else is ready to do the same. But it is possible, for instance, for a *mere fear* of overissue to destroy this confidence. The payee, who under ordinary circumstances submits patiently to whatever money is a customary or legal tender, may then take a hand and insist on " contracting out " the offending standard. That is, he may insist on making contracts in terms of the better metal, — gold, for instance, — and thus contribute to the further downfall in value of the depreciated paper.

Irredeemable paper money, then, like our irredeemable silver dollars, may circulate at par with other money if limited in quantity and not too unpopular. If it is gradu-

ally increased in amount, such irredeemable money may expel all metallic money and be left in undisputed possession of the field.

But though such a result — a condition of irredeemable paper money as the sole currency — is possible, it has never proved desirable. On the contrary, irredeemability is a constant temptation to abuse, and this fact alone causes business distrust and discourages long-time contracts and enterprises. Irredeemable paper money has almost invariably proved a curse to the country employing it. While, therefore, redeemability is not absolutely essential to produce parity of value with the primary money, it is practically a wise precaution. The lack of redeemability of silver dollars in the United States is one of the chief defects in our unsatisfactory monetary system and a continuing danger.

§ 5. The "Limping" Standard in the United States

Among the nations which now have the limping standard is the United States. In 1792, Congress adopted complete bimetallism. Full legal-tender quality was given to both gold and silver coins; both were to be coined freely and without limit at the ratio of 15 ounces of silver to 1 of gold. This coinage ratio was soon found to be below the bullion or market ratio; it overvalued silver, as money, and consequently gold (which was, as bullion, the dearer or better money) tended to leave the country, so that although nominally bimetallic, the country came actually to a silver basis.

Influenced partly by the desire to bring gold back into circulation, and partly also perhaps by the supposed discoveries of gold in the South, Congress passed acts in 1834 and 1837 establishing the ratio of "16 to 1," — or, more exactly, 16.002 to 1 in 1834, and 15.998 to 1 in 1837. Whereas silver money had been overvalued by the previous laws, by these new laws gold money was overvalued. That is, the

commercial ratio continued to be near 15½ to 1, while the monetary ratio was slightly greater. This remained the case up to 1850; consequently, in accordance with Gresham's Law, gold money, now the cheaper, drove out silver money, and the United States became a gold-standard country. In 1853, to prevent the exportation of our subsidiary silver coins their weight was reduced.

The United States continued to be a gold-using country until the period of the Civil War, during which "greenbacks," or United States notes, were issued in considerable excess. Again Gresham's Law came into operation. Gold was in turn driven from the currency, and the United States came to a paper standard. For some years after the close of the war the country remained on a paper standard, little gold being in circulation, except on the Pacific coast, and not much silver anywhere.

In 1873 Congress passed a law (called by bimetallists the "Crime of '73") by which the standard silver dollar was entirely omitted from the list of authorized coins. Of course this could not have had any immediate effect on the flow of gold and silver, because the country was at the time on a paper basis. But when specie payments (*i.e.* gold and silver payments) were resumed in 1879, this repeal of the free coinage of silver brought the country to a gold standard, not to a silver one. Had it not been for the law of 1873, the United States, when it returned in 1879 to a metallic basis, would have been a silver country with a standard considerably below the gold standard it actually reached. Our monetary problems would then have been very different from what they actually became.

The greenbacks, however, were not all canceled. By the express provision of a law passed in 1878 nearly $347,000,000 of the "greenbacks" were retained in circulation, and have been in circulation ever since. They have been kept at par with gold because: (1) they are limited in amount; (2) they are redeemable in gold on de-

mand; (3) they are receivable for taxes and are legal tender. But in returning to a gold basis, we reintroduced the silver dollar in a minor *rôle*. Although the free coinage of silver was not resumed, the advocates of silver, through the "Bland-Allison Act" of 1878 and the "Sherman Act" of 1890 which replaced it, succeeded in pledging the government to the purchase of large, but not unlimited, amounts of silver and the coinage of a large, but not unlimited, number of silver dollars. The Bland-Allison Act required the Secretary of the Treasury to purchase every month from $2,000,000 to $4,000,000 worth of silver and to coin it into standard silver dollars. The Sherman Act required the purchase, every month, of 4,500,000 ounces of silver.

Under these acts 554,000,000 silver dollars were coined, although less than 20 per cent of them have ever been put in actual circulation. Silver certificates redeemable in silver dollars on demand, and, for a time, treasury notes, have circulated in the place of this immense mass of silver; the silver dollars (and therefore the silver certificates) maintain their value on a parity with gold primarily because they are limited in supply. Also in practice, though not by any compulsion of law, they are redeemed on demand in any form of money desired, including gold. No law directly provides for the redemption of silver certificates in gold, but it is made the duty of the Secretary of the Treasury to take such measures as will maintain their parity with gold.

In 1893 the Sherman Act was repealed, and in 1900 a law was passed specifically declaring that the United States shall be on a gold basis.

§ 6. Our Present Monetary System

The system of the limping standard, now obtaining in the United States, logically forms a connecting link between complete bimetallism and those "composite" systems by which *any* number of different kinds of money may be

simultaneously kept in circulation. The manner in which most modern civilized states have solved the problem of concurrent circulation has been to use gold as a standard, and to use silver, nickel, and copper chiefly as subsidiary money, limited in quantity, with, in most cases, limited amounts of paper money, the latter being usually redeemable. The possible variations of this composite system are unlimited. In the United States at present we have a system which is very complicated and objectionable in many of its features — especially (as we shall presently see) in its lack of elasticity. Gold is the standard and is freely coined. A limited number of silver dollars, worth, money-wise, more than double their value bullion-wise, are the heritage of former bimetallic laws rendered inoperative by the paper money of the Civil War and expressly repealed in 1873. The two unfortunate attempts of 1878 and 1890 to return halfway to bimetallism by the purchase of silver — attempts discontinued in 1893 — have greatly swollen the volume of coined silver. The attempt to force silver dollars into circulation was not acceptable to the business world, and Congress therefore issued two forms of paper to take their place. The chief form is the "silver certificate." For each silver certificate a silver dollar is kept in the vaults of the United States government.

The absurdity of the situation consists in the fiction that somehow the silver keeps paper at par with gold. The paper would keep its parity with gold just as well if there were no silver. A silver dollar as silver is worth less than a gold dollar just as truly as a paper dollar, as paper, is worth less than a gold dollar. The fact that the silver is worth half a dollar, while the paper is worth only a fraction of a cent, will not avail in the least to make the paper worth a whole dollar. A pillar which only reaches halfway to the ceiling cannot hold the ceiling up any more than a pillar an inch high.

The paper representatives of silver might always con-

tinue to circulate as well as they do now, even if the "silver behind them" were non-existent, except that the absurdity of the situation would then be so apparent that they would probably be retired. Whether the half-billion dollars of new currency, which came into circulation with the Bland and Sherman Acts, are of silver, overvalued to the extent of 50 per cent, or of paper, overvalued to the extent of 100 per cent, does not really affect the principle of the limping standard which keeps silver dollars at par with gold. The idle silver in the treasury vaults represents mere waste, a subsidy given by the government to encourage silver mining. Its only real effect to-day is to mislead the public into the belief that in some way it keeps or helps to keep silver certificates at par with *gold;* whereas, it is kept at par simply by its limited amount. It cannot fall below par without displacing gold, and it cannot displace gold because there is not enough of it.

Another and equally useless anomaly is the existing volume of "greenbacks." These are United States government notes. Under the law of 1875, the greenbacks were by 1879 retired in sufficient numbers to restore parity with gold; but by a counterlaw of 1878, 347,000,000 of them were kept in circulation and are in circulation now. As soon as redeemed, they must be reissued; they cannot be retired. These are a fixed ingredient in our money *pot pourri*, neither expansive nor shrinkable. It is absurd to redeem but not retire — in fact, almost a contradiction in terms. This absurdity has at times seriously embarrassed the government.

The next feature of our currency to be considered is the bank note. Although the National Banks acts wiped out the old, ill-assorted state bank notes by taxing them out of existence, and supplied us with a better and uniform system of national bank notes, it tied these notes up with the war debt, and they have remained so tied ever since, in spite of the fact that the advantages of the connection have long been terminated and the disadvantages have grown

acute. National bank notes cannot legally be issued in excess of the government debt, however urgent the need for them; nor can the government pay its debt without thereby compelling national banks to cancel their notes. The result is an inelastic currency which, instead of adjusting itself to the seasonal fluctuations in trade, and thus mitigating the ensuing variations in the price level, remains a hard and solid mass to which the other elements in the equation of exchange must adapt themselves.

It is clear that the elements of our currency just enumerated (except gold) are inelastic, *i.e.* practically fixed in quantity. The remaining elements, namely, fractional and minor coins, are the only ones besides gold which, as regards their proportion to other money, are adjustable to changing conditions. The government certificates of deposit of gold and currency are not adjustable, because they are scarcely independent features, being simply convenient receipts for deposits of gold or of greenbacks.

In the United States, then, we have a currency system in which gold, the basis of it all, constitutes directly, or by means of gold certificates, about one third of the total monetary circulation, and in which the remainder consists almost wholly of elements which are inelastic and almost unchangeable. Consequently, to meet any modification in other factors of the equation of exchange, — such, for instance, as trade, — the gold in circulation must bear the burden. But any modification of the gold in circulation can cause only one third as great a proportionate change in the total money in circulation, and almost all the burden of adjusting the quantity of money to the other changes in the equation of exchange is thrown on gold. As gold requires time for minting or transportation, the adjustment is slow and clumsy as compared with the prompt issue or retirement of bank notes practiced in other countries. The seasonal changes in the purchasing power of money, as well as the changes connected with crises and credit cycles, are therefore greatly and unnecessarily aggravated.

CHAPTER XIV

CONCLUSIONS ON MONEY

§ 1. Can "Other Things remain Equal?"

THE chief purpose of the last six chapters is to set forth the causes determining the purchasing power of money. This purchasing power has been studied as the effect of three, and only three, groups of causes. The three groups center on currency, on its velocity, and on the volume of trade. These and their effects, prices, we saw to be connected by an equation called the equation of exchange, $MV + M'V' = \Sigma pQ$. The three causes, in turn, we found to be themselves effects of antecedent causes lying entirely outside of the equation of exchange, as follows: the volume of trade will be increased, and therefore the price level correspondingly decreased by the differentiation of human wants; by diversification of industry; and by facilitation of transportation. The velocities of circulation will be increased, and therefore the price level increased correspondingly by improvident habits; by the use of book credit; and by rapid transportation. The quantity of money will be increased, and therefore the price level increased correspondingly by the import and minting of money, and, antecedently, by the mining of the money metal; by the introduction of another and initially cheaper money metal through bimetallism; and by the issue of bank notes and other paper money. The quantity of deposits will be increased, and therefore the price level increased correspondingly by extension of the banking system and by the use of book credit. The reverse causes produce, of course, reverse effects.

Thus, behind the three sets of causes which alone affect the purchasing power of money, we find over a dozen antecedent causes. If we chose to pursue the inquiry to still remoter stages, the number of causes would be found to increase at each stage in much the same way as the number of one's ancestors increases with each generation into the past. In the last analysis myriads of factors play upon the purchasing power of money. But it would be neither feasible nor profitable to catalogue them. The value of our analysis consists rather in simplifying the problem by setting forth clearly the three proximate causes through which all others whatsoever must operate. At the close of our study, as at the beginning, stands forth the equation of exchange as the great determinant of the purchasing power of money. With its aid we see that normally the quantity of deposit currency varies directly with the quantity of money, and that therefore the introduction of deposits does not disturb the relations we found to hold true before. That is, it is still true that (1) prices vary directly as the quantity of money, provided the volume of trade and the velocities of circulation remain unchanged; (2) that prices vary directly as the velocities of circulation (if these velocities vary together), provided the quantity of money and the volume of trade remain unchanged; and (3) that prices vary inversely as the volume of trade, provided the quantity of money — and therefore deposits — and their velocities remain unchanged.

But the question now arises, can the factors here supposed to "remain unchanged" actually do so? To this we answer, "Yes, with one exception." A change in the volume of trade (in a certain case now to be explained) may affect, besides prices, the velocities of circulation so that the supposition that these velocities "remain unchanged" becomes untrue. The case in which a change in trade effects changes in velocities of circulation is this: when the change in trade more than keeps pace with the changes in popu-

lation so that it involves a change in per capita trade. At a given price level, the greater the per capita expenditure, the more rapid the individual turnover. The rich have a higher rate of turnover than the poor. They spend money faster, not only absolutely, but relatively, to the money they keep on hand. Statistics collected at Yale University of several hundred cases of individual turnover show that. The man who spends much, though he needs to carry more money than the man who spends little, does not need to carry as much in proportion to his expenditure. This is what we should expect; since, in general, the larger any operation, the more economically it can be managed.

We may therefore infer that, if a nation grows richer per capita, the velocity of circulation of money will increase. This proposition, of course, has no reference to *nominal* increase of expenditure. As we have seen, a doubling of all prices, wages, and salaries would not affect anybody's rate of turnover of money, except *nominally*. Each payer would need to make exactly twice the expenditure for the same actual result and to keep on hand exactly twice the money in order to meet the same contingencies in the same way. The real expenditure of a person, on the other hand, is measured by the comparative *quantity* of things bought, not by their *value* in money. We conclude, therefore, that a change in the volume of trade, when it affects the *per capita* trade, affects velocity of circulation as well, *i.e. real* velocity. It is, in fact, another name for the volume of trade of that person.

We find, then, that an increase in trade, unlike an increase in currency or in velocities, has other effects than simply on prices; for, in fact, it increases the magnitudes on the opposite side of the equation. But with the exception above named, and apart from transition periods, the proportions already stated still hold true. In particular, a change in the quantity of money causes an exactly proportional change in prices.

The " quantity theory " does not claim that while the quantity of money in circulation (M) is increased, *other* causes may not at the same time affect M', V, V', and the Q's, and thus aggravate or neutralize the effect of M on the p's. But these are not the effects of M. So far as M *by itself* is concerned, its effect is only on the p's and is strictly proportional to its quantity.

The importance and reality of this proposition is not diminished in the least by the fact that these other causes do not, as a matter of fact, remain quiescent and allow the effect on the p's of an increase in M to be seen separately from all other effects. The effects of changes in M are blended with the effects of changes in the other factors in the equation of exchange just as the effects of gravity upon a falling body are blended with the effects of the resistance of the atmosphere.

Our main conclusion, then, is that we find nothing to interfere with the truth of the quantity theory; that variations in money (M) produce, normally, proportional changes in prices.

We have now finished with the principles determining the purchasing power of money. By the aid of these principles the student should be able to avoid hereafter most of the fallacies and pitfalls which beset the subject. He will find it a useful exercise to turn back to Chapter I and test himself by analyzing as many as he can of the money fallacies there stated. The others we hope to clear up in later chapters.

§ 2. An Index Number of Prices

We have been studying the causes determining the purchasing power of money or, its reciprocal, the level of prices. Hitherto we have not defined exactly what a " general level " of prices may mean. There was no need of such a definition so long as we assumed, as we have usually done hitherto,

that all prices move in perfect unison. But practically, prices never do move in perfect unison. If some p's do not rise enough to preserve our equation, others must rise more. If some rise too much, others must rise less. The case is further complicated by the fact that some prices cannot adjust themselves at all and some can adjust themselves but tardily. A price fixed by contract cannot be affected by any change coming into operation between the date of the contract and that of its fulfillment. The existence of such contracts constitutes one of the chief arguments for a system of currency such that the uncertainties of its purchasing power are the least possible. Contracts are a useful device; and an uncertain monetary standard disarranges them and discourages their formation. Even in the absence of explicit contracts, prices may be kept from adjustment by implied understandings and by the mere inertia of custom. And besides these restrictions on free movement of prices there are often legal restrictions; as, for example, when railroads are prohibited from charging over two cents per passenger per mile, or when street railways are limited to five-cent or three-cent fares. Whatever the causes of non-adjustment, the result is that the prices which *do* change will have to change in a greater ratio than they would were there no prices which do not change. Just as an obstruction put across one half of a stream causes an increase of current in the other half, so any deficiency in the movement of some prices must cause an excess in the movement of others.

Another class of goods, the price of which cannot fluctuate greatly with other prices, are those special commodities which consist largely of the money metal. Thus, in a country employing a gold standard, the prices of gold for dentistry, of gold rings and ornaments, gold watches, gold-rimmed spectacles, gilded picture frames, etc., instead of varying in proportion to other prices, always vary in a smaller proportion. The more predominantly the price of

the article depends upon the gold as one of its raw materials, the narrower is the range of variation.

From the fact that gold-made articles are thus more or less securely tied in value to the gold standard, it follows also that the prices of substitutes for such articles will tend to vary less than prices in general. These substitute articles will include silver watches, ornaments of silver, and various other forms of jewelry, whether containing gold or not.

A further dispersion of prices is produced by the fact that the special forces of supply and demand are playing on each individual price, and causing relative variations among them, and although (as we have before emphasized) these prices cannot affect the general price level, they can affect the number and extent of individual divergencies above and below that general level.

It is evident, therefore, that prices must constantly change *relatively to each other*, whatever happens to their general level. It would be as idle to expect a uniform movement in prices as a uniform movement for all bees in a swarm. On the other hand, it would be as idle to deny the existence of a *general* movement of prices because they do not all move alike as to deny a general movement of a swarm of bees because the individual bees have different movements.

Besides these changes in individual *prices*, there will be corresponding changes in the *quantities* of the commodities which are exchanged at these prices respectively. In other words, as each p changes, the Q connected with it will change also; because usually any influence affecting the price of a commodity will also affect the consumption of it.

We see, therefore, that it is well-nigh useless to speak of uniform changes in prices (p's) or of uniform changes in quantities exchanged (Q's). Therefore, instead of supposing such uniform changes, we must now proceed to the problem of developing some convenient method of averag-

ing these two groups of un-uniform changes. We must formulate two composite or average magnitudes: the *price level* and the *volume of trade.*

It is desired, then, in the equation of exchange, to *convert* the right side, ΣpQ, into the form PT, T, measuring the volume of trade, and P expressing the price level at which this trade is carried on. This P is what we shall call an "index number," or average. These magnitudes, price level (P) (the index number of prices in general) and volume of trade (T) need now to be more precisely formulated.

T is conceived as the *sum* of all the Q's, and P as the *average* of all the p's.

To carry out these definitions in practice, suitable *units* of measure for the various articles must be selected. The ordinary units in which the various Q's are measured will not be the most suitable. Coal is sold by the ton, sugar by the pound, wheat by the bushel, etc. If we should merely add together these tons, pounds, bushels, etc., and call their grand total so many "units" of commodity, we should have a very arbitrary summation. The system becomes less arbitrary and more useful for the purpose of comparing price levels in different years if we use, as the unit for measuring any goods, not the unit in which it is commonly sold, but the *amount which constitutes a "dollar's worth" at some particular year called the base year.* Then *every* price in the base year becomes exactly one dollar, and the *average* of all prices in that year also becomes exactly one dollar. Any other year, the average price (*i.e.* the average of the prices of the newly chosen units which in the base year were worth a dollar) will be the index number representing the price level, while the number of such units will be the volume of trade.

Introducing, then, our newly found magnitudes P and T into the equation of exchange, it assumes the form

$$MV + M'V' = PT,$$

and its right member is the product of the index number P (or average of prices) multiplied by (the volume of trade) T (or sum total of units sold).

This completes all we need say of the theory of index numbers, or average prices. In actually averaging the price, say in 1910, of various articles (the prices of those amounts which were a dollar's worth in, say, 1900) we must, of course, take due account of the relative importance of these various articles. The prices of wheat or iron are to be given more weight in constructing our average than those of toothpicks or eyeglasses, for the trade in wheat or iron is far more important than the trade in toothpicks or eyeglasses. There are various ways of giving the proper " weight " to different articles, but the results differ so little from each other that it is not worth our while to consider them.

§ 3. The History of Price Levels

It is impossible to have absolutely accurate index numbers, but those constructed for recent years by the United States Bureau of Labor are accurate enough for all practical purposes. For the remote past we have only very rough index numbers, because the records of prices in past times are so defective. These rough index numbers are sufficient, however, to show that the general trend of prices during the last ten centuries has usually been upward. We may say that prices are now about ten times as high as a thousand years ago, and that they are from four to six times as high as in the period between A.D. 1200 and A.D. 1500. And since the last-named date also, or since shortly after the discovery of America, prices have almost steadily risen. The successive opening of mines has been largely responsible for this rise.

From this telescopic view of the past we turn to what may be called by contrast a microscopic view of the present. We shall confine ourselves to the events of the last decade and a half in the United States.

For the years 1896–1909 we are able to construct fairly accurate estimates of all the factors in the equation of exchange, M, M', V, V', P, T. The statistics of these magnitudes for the fourteen years mentioned are all presented in Figure 14. In this diagram the equation of exchange for each year is represented by the mechanical balance described in a previous chapter.

We note that every factor has greatly increased in the fourteen years considered. The quantity of money in circulation (M, represented by the purse) has nearly doubled; bank deposits subject to check (M', represented by the bank book) have more than doubled; the volume of trade (T, represented by the weight at the right) has doubled; the velocity of circulation of money (V, represented by the "arm" of the purse, or its distance from the fulcrum) has increased slightly, and the velocity of circulation of bank deposits (V', represented by the "arm" of the bank book) has increased considerably. As the net result of these changes, the index number of prices (P, or the "arm" of the weight at the right) has increased about two thirds. The price level of 1909 is taken as 100 per cent. On this scale the price level of 1896 is 60 per cent, and that of the other years, as indicated. The volume of trade is represented as the number of "dollars' worth in 1909." Thus the actual value of trade in 1909 was $387,000,000,000 worth, or over a billion a day. The trade in 1896 was $191,000,000,000 worth, reckoned, of course, *at the prices of* 1909, not at the prices of 1896. At the prices of 1896 the value of the trade in 1896 was only $115,000,000,000. This is PT, *i.e.* $191,000,000,000 × 60 per cent.

It is interesting to observe the changes in all the factors before and after the crisis of 1907. These changes, it will be noted, fulfill the principles explained in the chapter on crises.

From 1896 to the present time, prices have been rising

because of the extraordinary rise in gold production and consequent increase in money media of all kinds.

The gold of South Africa, combined with the gold from the rich mines of Cripple Creek and other parts of the Rocky Mountain Plateau, and reënforced by gold from the Klondike, has caused, and is still causing, a rapid rise of prices.

The history of prices has in substance been a race between the increase in media of exchange (M and M') and the increase in trade (T), while we assume that the velocities of circulation have changed in a much less degree. Sometimes the circulating media shoot ahead of trade, and then prices rise. Sometimes, on the other hand, circulating media lag behind trade, and then prices fall.

The outlook for the future apparently promises a continued rise of prices due to a continued increase in the gold supply.

The most careful review of present gold-mining conditions suggests the probability of a continuance of gold inflation for a generation or more. De Launay, an excellent authority, says, "For at least thirty years we may count on an output of gold higher than, or at least comparable to, that of the last few years." This gold will come from the United States, Alaska, Mexico, the Transvaal, and other parts of Africa and Australia, and later from Columbia, Bolivia, Chili, the Ural Province, Siberia, and Korea.

It is difficult to predict the future growth of trade, and therefore impossible to say for how long gold expansion will keep ahead of trade expansion. That for many years, however, gold will outrun trade seems probable, for the reason that there is no immediate prospect of a reduction in the percentage growth of the gold stock nor an increase in the percentage growth of trade. Not only do mining engineers report untold workable deposits in outlying regions (for instance, a full billion of dollars in one region

of Columbia alone), but any long look ahead must reckon with possible and probable cheapening of the processes of gold extraction. The cyanide process, for instance, has made low-grade ores pay which did not pay before. If we let imagination run a little ahead of our times, we may expect similar improvements in the future whereby still lower grades may be worked, or possibly the sea compelled to give up its gold. Like the surface of the continents, the waters of the sea contain *many thousand* times as much gold as all the gold thus far extracted in the whole history of the world. We have seen that inflation is, in general, an evil, likely to culminate in a crisis. It is therefore to be hoped that the knowledge of how to get this hidden treasure may not be secured, or at least, may be secured but gradually.

It is unfortunate that the purchasing power of money should be always at the mercy of every chance in gold mining. There are few businesses more subject to chance than gold mining. There are always chances of finding new gold deposits, chances of their "panning out" well or ill, and chances of new methods of metallurgy. On these fitful conditions the purchasing power of money is dependent. Consequently every one interested in long-time contracts, whether debtor or creditor, stockholder or bondholder, wage earner or savings bank depositor, is made to some extent a partaker in these chances. In a sense every one of us who uses gold as a standard for deferred payments becomes a gold speculator. We all take our chances as to what the future dollar shall be. The problem of making the purchasing power of money stable so that a dollar may *be* a dollar — the same in value at one time as another — is one of the most serious problems in applied economics. As yet it has received very little attention. The advocates of bimetallism have claimed that "the bimetallic standard" possesses greater stability than either the gold or silver standard. Many other and very

ingenious schemes for a more stable currency have been proposed but have received very little attention. One scheme has been suggested which, although it allows the present fluctuations to continue, aims to avoid the evils which these fluctuations cause. This is to permit long-time contracts to be *corrected* from time to time, according to changes in the purchasing power of money as shown by an official index number of prices. Under this plan if a man borrowed $1000 in 1910, and prices rose 10% in a year, he would have to repay as his principal in 1911 not simply $1000 but 10% more than $1000. His interest payments would be corrected in the same way.

As the consideration of these schemes belongs to applied economics, we shall not discuss them here.

CHAPTER XV

SUPPLY AND DEMAND

§ 1. Individual Prices presuppose a Price Level

We have completed our study of the purchasing power of money, which, as we have seen, is really a study of price levels. Our next topic will be individual prices. It has already been shown that individual prices, such, for instance, as the price of sugar, presuppose a price level. This fact is one reason why we have considered price levels before considering individual prices.

Before proceeding to the causes determining individual prices, it will be advisable to explain more fully the proposition that an individual price presupposes a price level.

The price of sugar is a ratio between sugar and money. Any one who buys sugar balances in his mind the importance of the sugar to him against the importance of the money which he has to pay for it. In making this comparison, the money stands in his mind for the other things which it might buy if not spent for sugar. If the purchasing power of money is great, it will seem precious in his mind, and he will be more loath to part with a given amount of it than if its purchasing power is small; that is, the greater the power of money to purchase things in general, the less of it will be offered for sugar in particular, and the lower the price of sugar will therefore become. In other words, the lower the general price level, the lower will be the price of sugar. In still other words, the price of sugar must *sympathize* with prices in general. If they are high, it will tend to be high, and if they are low, it will tend to be low. Before the purchaser of sugar can decide how much money he is willing to

exchange for it, he must have some idea of what else he could buy for his money. This explains why a traveler feels at first so helpless in a foreign country when he is told the price of sugar or of any other article in terms of unfamiliar units. If the traveler has never heard before of kroner, gulden, rubles, or milreis, any prices expressed in these units will mean nothing to him. He cannot say how many of any one of these units he is willing to pay for a pound of sugar until he knows how the purchasing power of that unit compares, for instance, with that of a cent or with that of a dollar. There must thus always be in the minds of those who use money some idea of its purchasing power. The sellers and buyers of sugar express the amounts they are willing to supply or to demand in terms of money, and money means to them merely purchasing power over other things. It is often said that supply and demand of sugar or of any other commodity determine its price, and this is true, provided a price level is first assumed. This proviso needs emphasis because it is so often overlooked. Although the purchasing power of money is assumed, we are usually as unconscious of it as we are of the background of a picture against which we see and measure the figures in the foreground.

§ 2. A Market and Competition

The terms "supply" and "demand," say, of sugar, thus imply a concealed reference to the purchasing power of money, *i.e.* to prices in general as well as to the price of sugar in particular. As we have, through several previous chapters, already studied the subject of prices in general, we shall hereafter assume that the general level of prices has been determined in accordance with the principles set forth in those chapters. We are ready to leave these general relations and to study the determination of a particular price (such as that of sugar) so far as this depends upon its own particular supply and demand in its own particular market.

A market for any commodity or good is any assemblage of buyers and sellers of that commodity or good. The buyers and sellers may be, and usually are, physically near each other, as on the New York Stock Exchange, or they may be merely connected by telegraph, telephone, or other communication, as in the stock market as a whole; for the stock market as a whole includes not only the members of the stock exchange present or on the floor of the exchange, but the members outside and their numerous customers in and out of the city. It is in the market that questions of supply and demand which we are about to discuss work themselves out.

Our study of price determination will fall under two heads, according as there is competition or monopoly. For the present, we shall assume a condition of perfect competition, that is, we shall assume that each man who offers to buy or sell does so independently of every one else. Thus, if self-interest leads him to do so, a buyer will bid a higher price than others, irrespective of their wishes in the matter, and likewise a seller will ask a lower price if his independent self-interest so leads him.

But until these independent bids meet, there will be no sales.

When there is a perfect competition, there is only one price for all buyers and all sellers. This is evident; for if there were more than one, no buyers would buy at the higher prices which had first been asked (and so these must therefore fall), and no seller would sell at the lower prices which had been bidden (and so these must therefore rise). The watchfulness of one competitor toward the other eliminates differences in price; even if not all buyers and sellers were careful to note slight differences in price, the more watchful would bring about the same result by becoming "speculators." They would buy at the lowest prices and sell at the highest. Their buying would raise the lowest prices and their selling would lower the highest.

In these ways differences in prices are reduced or entirely eliminated. It is true that in practice there remain slight differences in price, even in the same or closely associated markets. This fact simply means that competition is often imperfect. In our discussion we shall not take account of those cases, but consider only the simple case where competition is perfect.

§ 3. Demand and Supply Schedules

The terms " supply " and " demand " have a definite and technical meaning in economics, and the reader should note the following definitions carefully.

In any market there is a different demand for sugar at different prices. We may define the *demand at a given price* as the amount of sugar which people are willing to buy at that price. In the same way the *supply at a given price* is the amount which people are willing to sell at that price. If the price of sugar is 8 cents a pound, the demand for sugar in a given community at a given time may be, let us say, 900 pounds a week. If the price falls to 7 cents, the demand would increase, say, to 940 pounds. If the price falls to 6 cents, the demand would rise, say, to 1000 pounds, and so on. The supply of sugar, we shall suppose, changes in the opposite way. At 8 cents it may be 1100 pounds. At 7 cents, 1050, at 6 cents, 1000, etc. The following table shows these figures and others, and constitutes what are called "schedules" of demand and supply in relation to various prices.

Price	Schedules of Demand	Supply
.08	900	1100
.07	940	1050
.06	1000	1000
.05	1100	900
.04	1250	750

The schedule of demand is the second column considered relatively to the first. It shows the largest quantity which will be taken at each given price, or what amounts to the same thing, the smallest price at which a given quantity will be taken. When the relationship between the two columns is expressed in the last of these two ways, it is more convenient to place the second column first, and the first, second; but their order is immaterial. It is their relation to each other which constitutes the demand schedule.

In the same way the relation between the first and third columns constitutes the supply schedule. This tells us the largest quantities which will be supplied at stated prices, or what amounts to the same thing, the lowest prices at which stated quantities will be supplied.

Running the eye down the table, we see that, although the supply at first exceeds the demand, as the price falls, demand increases, and the supply decreases until, when the price reaches 6 cents, the supply and demand are equal. For prices lower than 6 cents we find the reverse condition, demand exceeding supply.

If the foregoing figures represent the demand and supply schedules showing the amounts that buyers are willing to pay and sellers to give at different prices, it is clear that there is only one price that will make supply and demand equal. That price is 6 cents, and that is the price that supply and demand will finally fix. The price cannot really be above 6 cents, for then supply would exceed demand, and the price would immediately fall. Nor can it be below, for then demand would exceed supply, and the price would rise. For instance, if the price were 8 cents, the supply (1100) would exceed the demand (900) by 200 pounds. Those wishing to sell this extra amount would then be unable to do so except by offering at a lower price, and their competition would drive the price down. On the other hand, if the price were 4 cents, the demand (1250) would exceed the supply (750) by 500 pounds, and those demand-

ing this extra amount would be unable to get it except by bidding a higher price, and their competition would then drive the price up.

Since, then, the price cannot really be either above or below 6 cents, it must be finally fixed at 6 cents. A price which thus makes supply and demand equal is said to "clear the market," and is called the *market price*. The amounts supplied and demanded at the market price are called the *amount marketed*, *i.e.* the amount actually bought by buyers and sold by sellers.

§ 4. Demand and Supply Curves

The relations discussed can be seen more clearly by means of a diagram. In Figure 15 is represented the demand for sugar at different prices.

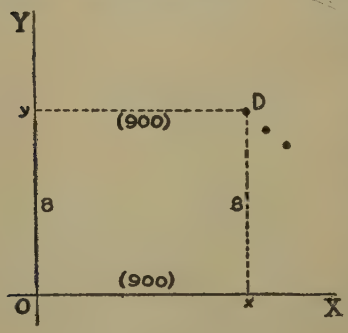


Fig. 15.

As in previous diagrams, the two axes OX and OY are drawn simply for reference, like the equator and the Greenwich meridian in a map. The intersection O of the two axes is called the "origin." The diagram is a "map" of demand on which the "latitude," or the distance above the line OX, represents any price; and the "longitude," the distance to the right of the line OY, represents the amount demanded at that price. Let us, for instance, represent an assumed price, say 8 cents, by measuring off the "latitude" OY from the origin O. The demand at this price of 8 cents, which we have seen to be 900 pounds, is represented by the "longitude" yD. We have thus located a point D, the "latitude" of which represents a particular price (8 cents), and the "longitude" of which represents the demand at

that price (900 pounds). It will be seen that the " latitude " is simply the elevation above the base axis OX, whether we measure this " latitude " by the line Oy or by Dx. Likewise the " longitude " is simply the distance of D to the right of the axis OY, whether this distance be measured by yD or by Ox. Having found one point, the " longitude " and " latitude " of which represent price and the demand at that price, we may find in like manner other points, the " latitudes " and " longitudes " of which will represent other particular prices and the corresponding demands. Several such points are indicated on the diagram. It will be seen that the lower in the diagram the points, the farther they will be to the right. This represents the fact that the lower the price, the greater the demand. We may suppose the spaces between those various points to be filled by other points, all together forming what is called the *demand curve*.

A demand curve, then, is a curve such that the " latitude " and " longitude " of each of its points represent respectively a particular price and the particular demand corresponding to that price. Thus a demand curve is a graphic picture of a demand schedule.

In precisely the same way we may treat supply. In Figure 16 let us represent any particular price, say 8 cents, by the " latitude " Oy and the *supply* corresponding to this price (1100 pounds) by the " longitude " yS. Thus we locate a point S such that its " latitude " (Oy or xS) represents a particular price, and the " longitude " (yS or Ox) represents the supply at that particular price. In like manner we may locate other points, the " latitudes " of which represent other prices and the " longitudes " of which represent the amounts which would be supplied at these

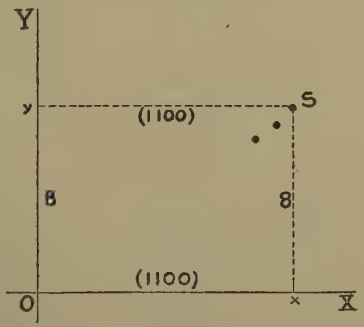


FIG. 16.

respective prices. These points are so arranged that the higher their "latitude," the greater their "longitude." This represents our assumption that the higher the price, the greater the supply. The curve which these points form is called a supply curve and is a graphic picture of a supply schedule.

In Figure 17 are drawn both the supply and demand curves, the demand curve being DD', and the supply curve, SS'. We have seen that the demand curve shows many different demands at many different prices, but that there is only one price at which supply and demand are equal. We can see this clearly in Figure 17, for there is only one point (P) in which the two curves intersect. The "latitude" of the intersection (P) of the curves DD' and SS' represents the *market price*. The "longitude" of P represents the *amount marketed*, which is at once the supply at that price and the demand at that price. The point P may be called the *market point*.

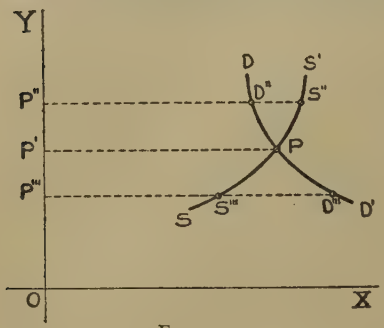


FIG. 17.

The market price OP' *clears the market*, and no other price will. If, for instance, we take a higher price, such as OP'', the supply will be represented by the long line $P''\ S''$, and the demand by the short line $P''\ D''$, leaving the distance between them, or $D''\ S''$, as the excess of supply over demand. The effort of sellers to get rid of this excess will drive the price down. Thus the market price cannot exceed OP'. In like manner, the market price cannot be lower than OP'. If, for instance, it were only OP''', the demand would be $P'''\ D'''$, and the supply only $P'''\ S'''$, leaving an excess of demand over supply of $D''\ S'''$, which at that price the buyers are unable to obtain. They will therefore

bid up the price. We see, then, that the only real price is OP'. The point P, at which the two curves intersect, is the only real point the latitude of which represents the market price and the longitude the actual amounts bid and sold. All the other points in the two curves are hypothetical, representing, not what demand and supply actually are, but what they would be at other prices than the real market price.

All demand curves descend to the right, but they descend at different rates. Those which descend very rapidly represent necessities, for the rapid descent means that it requires a great fall of price to materially affect demand. The demand for necessities such as salt does not change greatly, whether the price changes much or little.

At the other extreme are luxuries, the demand curves of which descend very slowly, thus interpreting the fact that a slight fall in price produces a great expansion in demand. If the price of champagne, for instance, is slightly changed, the amount of it consumed will be materially affected.

In the same way supply curves may ascend at different rates, those ascending speedily being commodities the supply of which cannot expand very much, even with a great increase in price. At the opposite extreme are the supply curves which ascend very slightly, being those of commodities the supply of which can be greatly increased by even a small increase in price.

Most of the articles produced in extractive industries such as agriculture or mining are of the rapidly ascending type, while manufactured articles often illustrate the slightly ascending type. It requires a great increase in the price of coal to materially affect the output of coal mines, but it requires only a slight rise in price of manufactured products to lead to an enormous increase in the output.

§ 5. Shifting of Demand or Supply

Having represented supply and demand by curves, we are now in a position to understand more clearly what is meant by "increase of demand" or "increase of supply." These phrases are often used loosely, without realization that they are ambiguous. Increase of demand, for instance, may mean one of two things. It may mean a shifting of the *market point* from one position A to another position B, farther to the right, on the same demand curve (Fig. 18), or again it may mean a shifting of the entire demand *curve* from the position A to the position B, farther to the right, (Fig. 19).

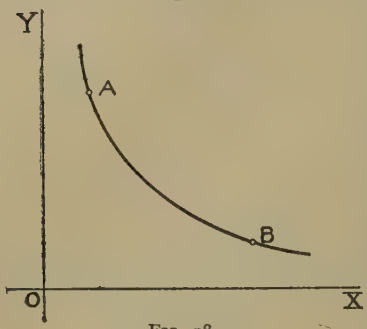


FIG. 18.

Both of these meanings are admissible, but they are entirely distinct. In the same way, "increase of supply" may mean one of two things, either a shifting of the market *point* A to another position B, farther to the right, on the same supply curve, as in Figure 20, or a shifting of the entire supply *curve* from the position A to the position B farther to the right, as in Figure 21. We see, therefore, that an "increase of supply or demand" may mean either a change of the point on the same curve or a change of the curve itself. To distinguish their two meanings we shall call the first an increase in the *point* sense and the

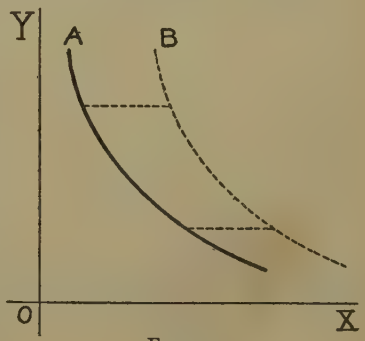


FIG. 19.

second an increase in the *curve* sense. We shall find that the curve sense is the more important and fundamental.

It will be seen that an increase of demand in the point sense is nothing else than an increase of supply in the curve sense; for we have already made it clear that there is only one point which is the intersection of the two curves, and that this point cannot be shifted to the right from *A* to *B* on the demand curve unless the supply curve has shifted so as to change the intersection. Such a shifting is seen in Figure 22. Here the demand has increased in the point sense, having changed from *A* to *B* on the same demand curve, but it has done so only *because* the supply has increased in the curve sense, having shifted from the position of the unbroken supply curve to the position of the dotted curve.

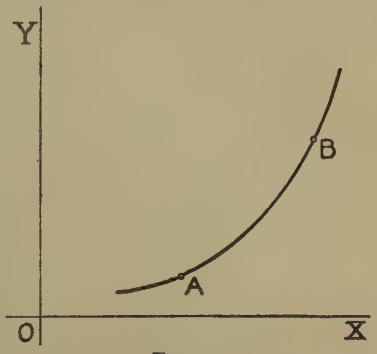


FIG. 20.

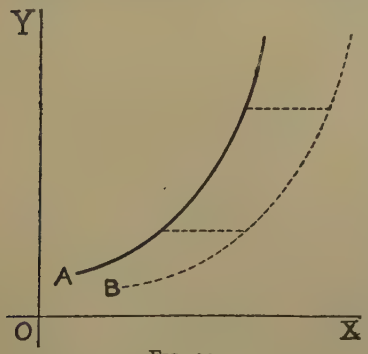


FIG. 21.

Again, to say that supply has increased in the point sense is the same thing as to say that the demand has increased in the curve sense. This is shown in Figure 23, where the point *A* on the supply curve has shifted to *B* on the same curve, because the demand curve had shifted from the unbroken to the dotted position.

We should, therefore, be careful to know when we speak of a change in demand or supply whether we mean that the change is in the point sense or in the curve sense. It seems

odd at first to think that the increase of demand in one sense is really an increase of supply in another sense, and *vice versa*. Because of this ambiguity, when one person speaks of an increase of supply, it means the same thing as when another speaks of an increase of demand.

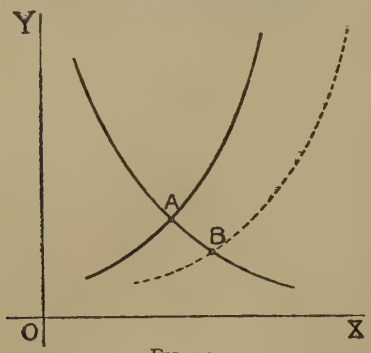


FIG. 22.

To illustrate the two meanings, let us suppose that the demand curve considered is the demand curve for automobiles, and that, given the same prices, people would demand automobiles now no more and no less than they did a few years ago, but that the condition of the supply has changed, so that now more automobiles can be supplied for the same price. That would mean that the supply curve had shifted to the right, so that its point of intersection with the same demand curve has shifted to the right. Therefore two things have happened on the demand side. The price has fallen, and as a consequence of that fall of price the number of automobiles demanded has increased. Demand in the point sense has increased. But demand in the curve sense has not changed at all. People are just as willing as before to take an automobile at $4000, but they are willing to take more automobiles at present low prices than they were willing to take at former high prices. What have changed are the conditions of supply.

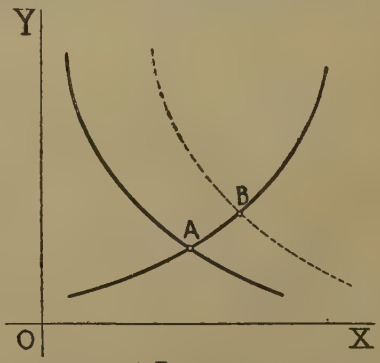


FIG. 23.

On the other hand, we might take as our illustration an article of luxury. In the last few years there has been a great change in the attitude of Americans toward works of art. Of these we are much more appreciative than we used to be, and are willing to pay more, for instance, for a fine painting than previously. Thus, for works of art the demand curve has shifted; the demand for works of art has increased in the curve sense. Consequently, the supply has increased in the point sense; namely, on account of the greater demand the price has risen, and therefore owners and makers of works of art have offered more for sale. Increase of demand in the curve sense brings about increase of supply in the point sense, and *vice versa*. An increase in the supply of automobiles in the curve sense brought about an increase in the demand for automobiles in the point sense, while an increase in the demand for works of art in the curve sense brought about an increase in the supply of works of art in the point sense. In either case the ultimate change is in a curve. There can evidently be no change of points of intersection except by a change in at least one of the two curves. Hereafter we shall use the phrases "increase of supply" or "increase of demand" only in the sense of shifting to the right the supply or demand *curve*.

When we shift demand or supply curves, the effect on the intersection, that is, on the market price and the amount marketed, will depend greatly on the character of the curves, whether, for instance, one or both of them ascends rapidly or slowly. It will be instructive for the student to draw on paper various pairs of intersecting curves where one is nearly horizontal or both are, and where one is nearly vertical or both are, and to observe the various effects thus obtained: first, by shifting the demand curve a given distance to the right or left, and second, by shifting the supply curve a given distance to the right or left. In actual fact, demand and supply curves are constantly shifting, with the result that their point of intersection is con-

stantly shifting, sometimes to the right, sometimes to the left, sometimes up and sometimes down. Consequently the market price and the amount marketed are changing from time to time.

The causes which shift the curves are innumerable. Changes in taste or fashion will affect demand curves, while changes in methods of production will affect the supply curves.

As to the variable point of intersection, we are more interested in its latitude than in its longitude, for the latitude represents the market price. This market price will evidently rise with a rise in either curve, and fall with a fall in either curve. It will also rise with a shifting of the demand curve to the right or with a shifting of the supply curve to the left; and will fall with a shifting of the demand curve to the left of the supply curve to the right. In fact, by a leftward change in the demand curve or a rightward change in the supply curve, the price may fall to zero. A standard example of such a case is furnished by the air we breathe, the supply of which is so much more abundant than the demand that it bears no price. The same is often true of water and of land of inferior qualities. There are millions of acres of land which may be had for practically nothing (a fact of much importance in a future chapter.)

One cause of shifting demand and supply curves mentioned in a general way at the beginning of this chapter may be especially emphasized. This cause is a change in the general purchasing power of money. Let us suppose that we change our monetary unit so that what is now 50 cents should be called a dollar. This would mean that the purchasing power of a dollar had been cut in two, or that the level of prices had been doubled. We ought, therefore, to find that the demand and supply of sugar will have been affected so as to double its price, — the latitude of the point of intersection, — and this is, in fact, the case. As soon as the half dollar became a dollar, the price in " dollars " at

which any given amount of sugar, such as Ox (in Fig. 24), is demanded, will evidently be doubled, becoming xB, which is twice xA. If previously people were willing to take Ox at one price, they are now willing to take it at double that price, because this double price means in purchasing power exactly the same thing as the original price. And in fact all points in the demand curve will be shifted to be twice as high as before.

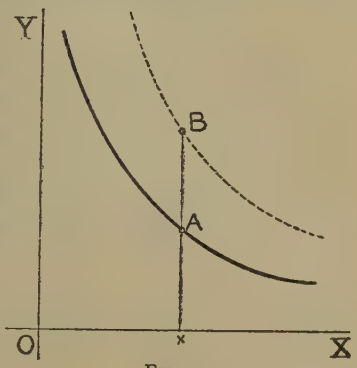


Fig. 24.

In the same way and for the same reasons, those who have sugar to sell will require twice as high a price as before for a given amount; so that, as indicated in Figure 25, each point, such as A, in the supply curve, will be shifted to twice as high an elevation above the base, OX.

When the two curves thus shifted are drawn on the same axes (see Fig. 26), it is evident that the new point of intersection, B, will be vertically over the old point of intersection, A.

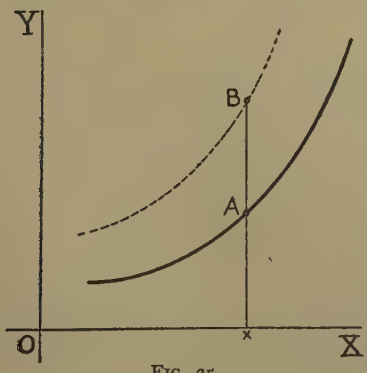


Fig. 25.

The price of market sugar is therefore doubled, though the amount marketed is unchanged. Simply the doubling of the general price level carries with it a doubling in the price of sugar. Practically, of course, it takes time to change a price level, and while the supply and demand curves for sugar may change for many other reasons than the doubling in general price level, so far as this cause,

taken by itself, affects the price of sugar, it doubles it. Our analysis of demand and supply curves then brings us back to the point already made, that the price of any one good like sugar depends partly on the general level of prices, or the purchasing power of money.

We can now see more clearly than before the shallowness of the idea that the supply and demand of each individual commodity fixes its price independently of other commodities. According to this view, the general price level is regarded as the effect of innumerable individual pairs of supply and demand curves, each pair being supposed to completely determine some one price. The opposite is the truth. The general price level is not the result of the supply and demand of sugar in relation to money, but is one of the causes affecting the supply and demand of sugar in relation to money, for we have seen that, as the price level rises or falls, the price of sugar rises, and falls, correspondingly.

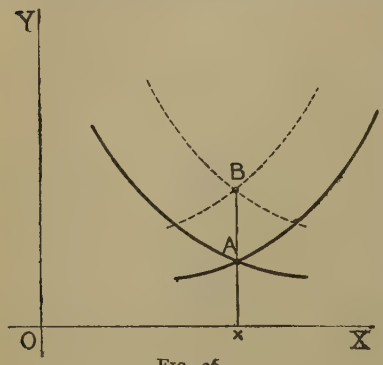


FIG. 26.

We end this chapter, therefore, with the statement with which we began, namely, that it is important to distinguish between the influences determining the general price level and the influences determining an individual price. The price level is determined by a comparatively simple mechanism, that of the equation of exchange. It is the result of the quantity of money and deposits, the velocities of their circulation and the volume of trade. The general price level then helps to fix individual prices, although not interfering with relative variations among them, just as the general level of the ocean helps fix the level of individual waves and troughs without interfering with variations among

them. The tides determine whether a wave shall be as a whole high or low, and so the general level of prices, while it does not fully fix the price of sugar, determines whether it shall be in general high or low. A rise (or fall) in the general price level is one of the many causes raising (or lowering) the demand and supply curves of sugar.

CHAPTER XVI

THE INFLUENCES BEHIND DEMAND

§ 1. Individual demand Schedules and Curves

We have seen that the market price of any particular good is that price in the demand and supply schedules which will just clear the market. Both market price and quantity marketed are determined by the intersection of the supply and demand curves. But the supply and demand curves are not the ultimate influences determining prices. They are only the proximate influences. Beneath and behind them lie influences more remote and more fundamental. In this chapter we shall consider those remoter influences so far as they have to do with the demand side of the market. Our problem, therefore, is to analyze the demand curve into its ultimate elements. In the preceding chapter the demand schedule or curve was considered as a cause. In this chapter it is considered as an effect of antecedent causes.

In the first place, the demand schedule or curve is for the community as a whole; and this community consists of a large number of individuals, each of whom contributes his share to the formation of the total demand. In fact, the total demand at any price is merely the sum of the individual demands at that price. For instance, let the following table represent the demand schedules for coal of Individual No. I and Individual No. II at prices of from $12 to $2 per ton:—

DEMAND SCHEDULES

PRICE	No. I (a)	No. II (b)	TOTAL ($a + b$)
$12	1	0	1
10	2	0	2
8	3	0	3
6	4	1	5
5	5	2	7
4	6	3	9
3	7	4	11
2	8	5	13

The last column gives the sum of the demands of these two individuals. If we should extend such a table to include the demand of all the individuals in the community, we would obtain the total demands in the community. The total demand schedule is thus found to be merely the sum of the individual demand schedules found by adding together all the individual amounts demanded at any given price. Behind the total demand schedule, therefore, are a number of constituent demand schedules.

The same relation, of course, holds between total and individual demand curves. In Figure 27 let the curve d_1d_1' represent the demand curve for Individual No. I, and d_2d_2' the demand curve for Individual No. II.

At a given price, Oy, the demands of these two individuals are respectively yd_1 and yd_2. The sum of these two demands is represented yD. Thus we add the longi-

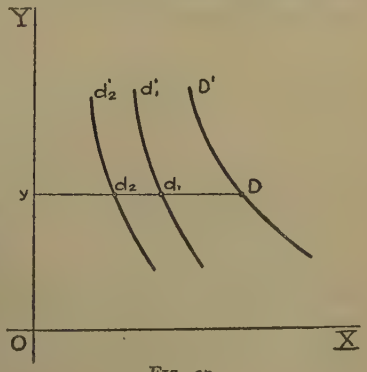


FIG. 27.

tudes of the two individual demand curves together to get the longitude of the combined curve DD'. If, instead of two individual demand curves, we should have all the demand curves for all the individuals in the market, and should add together, as already indicated, the longitudes corresponding to given latitudes, that is, the demands corresponding to given prices, we should thereby obtain the total demand curve as employed in the previous chapter.

To see more clearly the relations which the price bears to the individual, and to the total, curves of demand, we have drawn in Figure 28 an individual demand curve dd', the total demand curve DD', and the total supply curve SS'. The intersection of the last two determines the market price Px (or OP', or px'), and this price determines *for the individual* the amount $P'p$ (or Ox') which he will take at that price. Although, for the market as a whole, supply and demand fixes the price Px, for the individual, this price, thus fixed, in turn fixes the amount demanded.

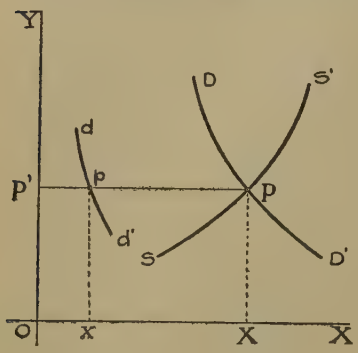


FIG. 28.

§ 2. Marginal Desirability

We have now found that back of the demand curve in any market lie the individual demand curves of all the people who compose that market. The next step is to find what causes lie back of the individual demand schedule. Taking, for instance, the demand curve of Individual No. I, we may ask, What are the conditions which determine its shape and size? The answer is that it depends upon the *desires* of Individual No. I. It is true that a man may

have a strong *desire* for something without having any *demand* for it. But this is simply because he desires still more the money he would have to spend for it. Every purchaser of goods balances two desires, the desire for the goods and the desire for the money they would cost. On the relative strength of these desires depends the price he is willing to pay. We have, therefore, to investigate these two desires, the one for goods, the other for money. We shall begin with the desire for the goods. The quality of an article by virtue of which it is desired may be called its *desirability*. The term "desirability" is identical with what is usually called "utility" in textbooks. "Desirability" is preferred here as a better term to express the idea intended. If there exists a keen desire to purchase a certain piece of land, we say that the land is especially desirable. So, also, with sugar or any other commodity or benefit that is desirable. *The desirability, then, of any particular goods, at any particular time, to any particular individual, under any particular conditions, is the strength or intensity of his desire for those goods at that time and under those conditions.*

The desirability of any particular goods may relate to the whole or to any part of a quantity of goods. The desirability of the entire quantity is called the total desirability; the desirability of one unit more or less of that quantity is called the marginal desirability. In economic science we have to do more with marginal than with total desirability, and it is therefore important that the concept of marginal desirability should be thoroughly understood.

The marginal desirability of any good is the desirability of one unit more or less of it. If a person possesses ten chairs, their marginal desirability is the difference, in his mind, between the desirability of having ten chairs and the desirability of having nine chairs; that is, it is the desirability which would be sacrificed by losing one chair. Or, what is almost the same thing, the marginal desirability of the group

of ten chairs is the desirability of one chair *more;* that is, the difference in desirability between eleven chairs and ten.

Whether the marginal desirability is taken as referring to one unit more or to one unit less is usually of so little importance as not to require separate designations to distinguish them, and in case the good is one which admits of indefinite subdivision, as flour, wheat, coal, etc., the two tend to coalesce as the size of the unit is reduced.

The total quantity of goods whose marginal desirability is under consideration may be any specified quantity of goods whatever. It may be a specified quantity of goods now existing, or a specified quantity of goods in the future, or a specified flow of goods through a period of time. For instance, by the marginal desirability of coal to an individual may be meant the marginal desirability of the particular stock of coal in his bin at the present moment. If this stock consists of fifteen tons, its marginal desirability is the desirability of the fifteenth ton, or the difference to him between the desirability of having fifteen and of having fourteen tons. Again, if a person is consuming in his household fifteen tons of coal a year, its marginal desirability at any instant is the desirability of the fifteenth ton, or the sacrifice which would be occasioned were he to reduce his *yearly consumption* from fifteen tons to fourteen. It is therefore necessary in each case to specify the particular quantity of goods referred to.

Undesirability is the opposite of desirability. Often we may express the same idea in terms of either word. For instance, it does not matter whether we speak of the desirability of keeping money, or the undesirability of losing it.

The first principle in regard to marginal desirability is that an increase in the quantity of goods whose marginal desirability is under consideration results in a decrease in the marginal desirability. Each unit in addition is less desirable than the preceding unit. The marginal desirability of sugar to the householder consuming five pounds

weekly is greater than the marginal desirability to the same householder if six pounds are consumed, and is successively diminished as each successive pound is added to his or her consumption.

It is well to remember that when the term "successively" is here used, it is metaphorically and not literally used. That is, the succession to which it refers is not a succession in fact, but a succession in thought. That is, we are considering the consumer of sugar under a series of different hypotheses which we examine successively. We begin with the hypothesis of a weekly consumption of five pounds, and take up successively the hypotheses of six pounds, seven pounds, eight pounds, etc. The desirability of the "last" or "marginal" pound in this series is what we consider the marginal desirability, but the "last" pound refers to the one *considered* last in our mental review, and not the one *acquired* last by the consumer. Marginal desirability is usually expressed as the desirability of "the last" unit. But by the "last" unit — say, the tenth chair — is not meant any particular chair of the ten, but merely the difference between having nine chairs and ten chairs. This fact needs to be emphasized, in view of frequent confusion on the subject occasioned by too loose an employment of the words "last" and "successive."

The *total* desirability of any quantity of goods is the sum of the desirabilities of the successive units. The total desirability of the ten chairs, for instance, is found by adding together (1) the desirability of having only one chair; (2) the desirability of having a second chair; (3) of a third; (4) of a fourth, etc., until ten chairs have been considered.

In exactly the same way we may define the marginal desirability of money. The marginal desirability of money at any particular time, to any particular individual, under any particular conditions, has the same sort of meaning as the marginal desirability of any other good. It is therefore

the strength or intensity of a man's desire for the additional dollar, or what amounts to the same thing, his reluctance to part with it. Briefly, the marginal desirability of money is the desirability of a dollar. Whenever he thinks of making a purchase, this desire comes into play, and the question of whether or not to buy is determined by his judgment as to whether or not the marginal desirability of the goods exceeds the marginal desirability of the price in money required to secure those goods.

§ 3. Individual Demands derived from Marginal Desirabilities

It is on such comparison of the marginal desirabilities of goods and money that the demand curve of each individual depends. We shall now illustrate in detail how demand depends on desirability by taking the desires and demand of a given individual (whom we shall call No. I) for a given good (such as coal). We are to show that the price Individual I is willing to pay is simply the ratio between two marginal desirabilities, that of coal and that of money.

If he thinks that one ton of coal is a dozen times as desirable to him as a dollar, he will evidently be willing to pay any price up to $12 for that ton. If the price is over $12, he will not buy even a ton of coal. If it is *just* $12, he is willing to buy *just* one ton. A second ton will be worth, in his estimation, somewhat less, being, let us say, only ten times as desirable as a dollar. He will then be willing to pay up to $10 for this second ton. If the price is $10, he will buy up to two tons; for at that price it will evidently be more than worth his while to buy the first ton and *just* worth his while to buy the second. If the desirability of a third ton is eight times the desirability of a dollar, he will be willing to pay up to $8 per ton for three tons; for at that price the first and second tons are more desirable than the money, and the third just as desirable. Likewise, if the desirability of

the fourth ton is six times that of a dollar, he is willing to pay a price up to $6 per ton for four tons.

In each case the highest price he is willing to pay for a given quantity is measured by the ratio of desirability of the last ton of that quantity to the desirability of a dollar. The consequent derivation of prices from desirabilities is summarized in the following table: —

Tons Purchased	Desirability of Each Successive Ton (*a*)	Desirability of a Dollar (*b*)	Price the Customer would be willing to Pay (*a* ÷ *b*)
1	12	1	$12
2	10	1	10
3	8	1	8
4	6	1	6
5	5	1	5
6	4	1	4

As indicated, the last column is found by taking the ratio of the figures in the first to those in the second; *i.e.* dividing (*a*) by (*b*). As there are no standard units of desirability, it will not matter what unit we select. In the table, for simplicity of division, we have taken as our unit for measuring desirability the marginal desirability of money of Individual I. We thus derive the individual's demand schedule from his schedules or desirabilities, which was our object. The resulting demand schedule is the fourth column considered with respect to the first column. It tells us the highest prices (column 4) Individual No. I is willing to pay for stated quantities of coal (column 1), or what amounts to the same thing, the largest quantities of coal he is willing to take at stated prices. As shown in the last chapter, it does not matter which way the relation is expressed.

In the preceding table the numbers expressing desira-

bilities and the numbers expressing price are the same because we took the marginal desirability of money as our unit of desirability. It is sometimes said that price is merely the expression of marginal desirability; *i.e.* that the price column merely duplicates the desirability column. But if we suppose another individual (No. II) who has precisely the same intensities of desire as No. I for coal, but who, on account of relative poverty, prizes each dollar twice as high, in comparing the two men we shall have to use the same unit of desirability, viz. the marginal desirability of money of Individual No. I. For Individual No. II the desirability of money is two such units. The result is the following table for Individual No. II: —

Tons Purchased	Desirability of Each Successive Ton (a)	Desirability of a Dollar (b)	Price the Customer would be willing to Pay ($a \div b$)
1	12	2	$6
2	10	2	5
3	8	2	4
4	6	2	3
5	5	2	2.50
6	4	2	2

The first ton has a desirability of 12 units just as did the first ton for Individual I, but the desirability of a dollar to Individual II is twice as great as that to Individual I, *i.e.* as two units of desirability. Hence the first ton, instead of being twelve times as desirable as a dollar, is only six times as desirable. Therefore he is willing to pay only up to $6 for it. The second ton, which has a desirability of ten units, is five times as desirable as a dollar, and he is therefore willing to pay only up to $5 a ton for two tons. The price he is willing to pay for three tons is measured by the number of times the marginal desirability of money (2) is contained in

the marginal desirability of the third ton of coal (8), which is four times — making the price $4. Likewise he is willing to pay 6 ÷ 2, or $3 a ton for four tons, and so on. Thus, just as in the case of Individual I, the prices in the last column are found by dividing the figures in the second column by those in the third. But in this case the figures in the last column are not identical with those in the second column, but are only half as great. Thus, the higher the marginal desirability of money, the lower the price which buyers are willing to give.

We see, then, that the two individuals, though they have precisely the same *desires* for coal, have very different *demands* for coal. If the price of coal is $5 a ton, Individual I will buy up to the fifth ton, for when he reaches the fifth ton, and not before, his marginal desirability of coal (5) will be just five times as desirable as a dollar (1). But at this same price of $5, Individual II will only buy up to two tons, for in his case $5 is the point at which the marginal desirability of coal (10) is five times the marginal desirability of a dollar (2). This contrast interprets the fact that the poor "cannot afford" to buy as much as the rich. The poor, like Individual II, have a relatively high marginal desirability of money.

It is easy to express these same relations by curves. The demand curve is, as we know, merely a graphic picture of a demand schedule. We may likewise draw desirability curves as graphic pictures of desirability schedules. And just as the demand schedule is derived by simple division from desirability schedules, so is the demand curve derived by simple division from desirability curves.

In Figure 29 the curve dd' is the desirability curve of coal for Individual No. I; *i.e.* it represents the desirability for him of each successive ton on coal as given in the preceding table.

Thus the latitude or height (12) of d represents the desirability of the first ton. The height (10) of the next point

to the right represents the desirability of the second ton, and so on to d', the height (5) of which represents the desirability of the fifth ton. The desirability of the fifth ton is called the "marginal desirability" of five tons, the desirability of the fourth the marginal desirability of four tons, etc. The latitude or height of each of the points from d to d' represents the marginal desirability of the amount of coal corresponding to the longitude of that point. The heights of the points which form a horizontal row one unit above the base represent the marginal desirability of money. From the heights of these two sets of points, — the upper ones representing the marginal desirability of coal and the lower ones representing the marginal desirability of money, — by simple division of the numbers indicated, we derive the demand curve for Individual No. I. As the divisor is in this case unity, this demand curve so derived will coincide with the curve dd'. Hence dd' will serve not only as the desirability curve for coal for Individual No. I, but also as the demand curve for Individual No. I.

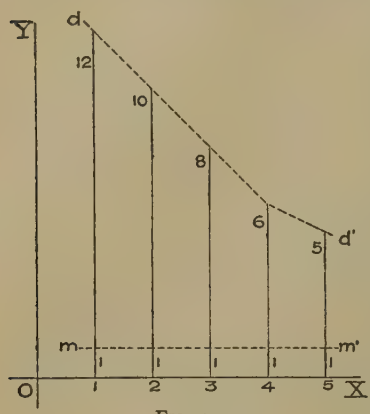


Fig. 29.

Figure 30 represents the corresponding curves for Individual No. II, for whom, by hypothesis, there are precisely the same marginal

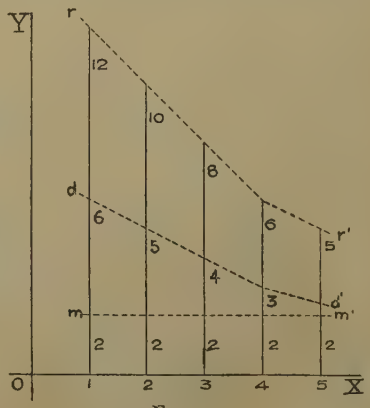


Fig. 30.

desirabilities of coal, but for whom the marginal desirability of money is twice as great. The upper points r to r' represent the marginal desirability of coal, and are at the same heights as the upper points d to d' in Figure 29. The lower points in Figure 30, however, are now *two* units high instead of one. Hence, when we divide the numbers 12, etc., for rr' by the number 2, we shall get as our demand curve a curve dd', which, unlike the demand curve for Individual I, will not coincide with rr', but will be everywhere only half as high.

We see, then, how to derive an individual demand schedule (or curve) by dividing, so to speak, one desirability schedule (or curve) by another. The resulting demand schedule (or curve) of coal will coincide with the schedule (or curve) of marginal desirability of coal if the marginal desirability of money be taken as the unit. Otherwise the demand schedule (or curve) will have its figures all standing in a given ratio to those of the schedule (or curve) of marginal desirability of coal.

In the last chapter we considered the price of coal as the effect of supply and demand and expressed by two curves. In this chapter we have seen that one of these two curves, the demand curve, is in turn the effect of innumerable individual demand curves; and finally, that each of these individual demand curves is in turn the effect of two desirability curves for the given individual. These desirability curves are the ultimate curves lying back of demand.

This is all true on the assumption that the marginal desirability of money for each individual remains constant, as represented in our tables or curves, being always 1 for Individual I and always 2 for Individual II. In other words, we have assumed that the marginal desirability of money is not appreciably affected by a large or small purchase of coal. Of course a purchase might be made so large or at so high a price that the marginal desirability of money would be appreciably affected. Theoretically, the marginal desira-

bility of money increases with every expenditure; the less money there is left, the more precious it becomes. But there are so many ways to spend money, and the expenditure on any one thing, such as coal, requires so small a drain on the total power to spend that the marginal desirability of money is not very different whether a man buys no coal at all or all he can afford. Consequently for the same individual, the desirability of a dollar may be regarded as a constant quantity represented, as in Figures 29 and 30, by the heights of a horizontal row of points.

§ 4. Relation of Market Price to Desirability

We shall now show that the market price of coal, although it is itself the ratio between two physical things, — the ratio of a quantity of money to a quantity of coal, — is, nevertheless, equal to the ratio between two intensities of desire in the mind of each purchaser — the ratio of the marginal desirability of coal to that of money. No individual demander of coal can, of course, determine the market price of coal. On the contrary, to him the market price seems to be fixed, and all that he can do is to adjust his purchase to it. But this adjustment, when practiced by all the numerous persons who demand coal, constitutes the whole demand side of the market, and exerts, therefore, a very powerful influence on price. Market price, we have seen, must "clear the market," and, applied to the demand side of the market, this means that the market price must be such that when each individual on the demand side adjusts his purchase to it in such a manner that the ratio of his marginal desirability of coal to his marginal desirability of money is equal to the price, the sum total of all such purchases (*i.e.* the total demand) shall equal the total supply.

This principle that the market price of any good is equal to the ratio between its marginal desirability and the mar-

ginal desirability of money is so important that it will be advisable to restate it in as many forms as possible.

We may state the stopping point of each purchaser in any one of the following ways: —

1. Each purchaser buys until the ratio between the desirability of the marginal unit and the desirability of the dollar is reduced to equality with the price.

2. Each purchaser buys until the desirability of the marginal unit is reduced to equality with the desirability of the money spent for them.

3. Each purchaser buys until his marginal gain (of desirability) is reduced to nothing.

4. Each purchaser buys until he makes his gain (or surplus desirability) a maximum.

The last two may require further explanation.

Evidently it is the same thing to say that a purchaser stops buying when the desirability of the last ton is *equal* to the desirability of the money paid for it, as to say that he stops buying when the last ton has *no excess* of desirability over the desirability of the money paid for it.

Let us examine the nature of the gain which the purchaser makes, and which is thus reduced to zero on the last ton. Evidently he gains no money; on the contrary, he loses it. What he does gain is *desirability*. His gain in desirability or his surplus desirability is the difference between the total desirability of the coal he buys and the total desirability of the money he has to sacrifice.

If the price is $5 per ton, in which case Individual I, as his schedule (or curve) shows, buys 5 tons, the *total* desirability of these 5 tons to him is 41 units of desirability, being the sum of the desirabilities as given in the schedule (or curve) for these 5 consecutive tons, viz. 12 + 10 + 8 + 6 + 5; the *sacrificed desirability* is the desirability of the $25 spent, which, as we assume that each dollar has 1 unit of desirability, is 25 units; the *surplus* desirability is the excess of the total over the sacrificed desirability, or 41 − 25

= 16 units. Now this gain of 16 consists of a diminishing gain on successive tons. On the first ton the gain is the difference between the 12 units which the ton is worth and the 5 units he must sacrifice to get it. This is 12 − 5 or 7 units; likewise the gain on the second ton is 10 − 5 = 5 units; on the third, 8 − 5 = 3 units; on the fourth, 6 − 5 = 1 unit; and on the fifth, 5 − 5 or zero. He stops his purchase at this point, for if he should extend it farther, he would lose desirability. The sixth ton, for instance, would yield only 4 units and cost him 5, and the seventh and later tons would cause greater losses.

Likewise for Individual II, who can only afford to buy 2 tons, the total desirability is 12 + 10 = 22 units of desirability; the sacrificed desirability is the desirability of the $10 paid, which, as each dollar is supposed to have 2 units of desirability, is 20 units; and the *surplus* desirability is 22 − 20 or 2 units. This gain is all on the first ton, as the second is only just worth its cost.

Individual I thus gains more than Individual II, though both gain something.

Still another method of stating the principle is that each buys so as to make the greatest possible gain of desirability. Evidently Individual No. I gets his greatest gain by buying 5 tons. His gains on these 5 tons were respectively 7, 5, 3, 1, and 0 units, making, as we have seen, an aggregate gain of 7 + 5 + 3 + 1 + 0 or 16 units. Had he stopped buying at the third ton, his gain would have been 1 unit less or 15 units. On the other hand, if he had bought 6 tons, he would have lost 1 unit on the sixth ton, which would have reduced his gain from 16 to 15. Thus by stopping at the fifth ton he gains the most he can.

The idea of something, not money, gained in a trade is important to grasp. By its aid we have no difficulty in understanding that *both* parties normally gain by a trade. Trade does not imply that one of the two parties gains at the expense of the other. This is true when one of the two

parties *cheats* the other, but normal trade is not cheating. Nevertheless, the idea that only one party can gain by a trade is an old and persistent one. It was largely responsible for attempts to regulate prices in the Middle Ages, to make the price "just" and prevent one party gaining at the expense of the other; it was also largely responsible for the sentiment in favor of encouraging the export trade but discouraging the import trade, a practice which implied that a nation was winning when it sold more than it bought, but losing when it bought more than it sold. In fact, the phrases "favorable balance of trade" and "unfavorable balance of trade," based on this idea, are still in use, although their original implication of gain or loss is gone. We now recognize that the country parting with money by buying goods from abroad may gain desirability just as the man who parts with money by buying coal gains desirability.

The idea of total desirability, as contrasted with marginal desirability, will serve to explain the old paradox that the most desirable things are not the highest in price. Nothing is so indispensable to us all as the air we breathe, yet its price is zero. The reason is now clear. Air is so abundant that the *marginal* desirability of air — the desirability of one additional cubic foot — is nothing at all, although the *total* desirability of air is great. An example of the opposite kind is found in jewelry. As compared with air, gold earrings have far less *total* desirability but far more *marginal* desirability. As the price depends on the marginal desirability, and has no reference to total desirability, we have no difficulty in reconciling the fact that earrings are worth more than air with the fact that air is more desirable than earrings.

§ 5. Importance of the Marginal Desirability of Money

The student will have noticed that the money element was present in all the stages of our study, and is still present even when we carry our analysis down to each individual mind.

A halving of the purchasing power of money halves its marginal desirability to each person. But as we have seen in desirability schedules (and curves) of Individuals I and II, the marginal desirability of any individual is a divisor to be divided into the marginal desirability of coal to give the price the individual is willing to pay for coal. Therefore to halve this divisor for each individual will result in doubling the quotient — the price he is willing to pay. In other words, the prices in each individual's demand schedule (or curve) will all be doubled by halving the purchasing power of money. Consequently the same is true of the total demand schedule (or curve). This is merely restating what has been said before, except that now we trace back the effects of a change in the purchasing power of money to each individual on the demand side of the market.

We can now see more clearly than in Chapter I how careful we should be when measuring values in terms of money. If our object is to compare desirabilities, we must correct our money comparisons for differences in the desirability of money. We must make allowance for differences in the importance of a dollar (1) between different people according to differences in wealth and needs, and (2) between different times or countries according to differences in price level.

(1) As to corrections between different people, if a millionaire's wife pays $10,000 for a brooch, while her poor neighbor pays $10 for a gown, we should not infer that the rich woman prizes her brooch a thousand times as much as the poor woman prizes her gown. This would be true if the desirability of a dollar were the same in the two cases, but as it is likely that the poorer woman prizes a dollar more than a thousand times as highly as the richer woman, it is altogether probable that the gown is of more importance to the poor woman than the brooch is to the rich one. Yet in money the brooch is worth a thousand times the gown.

From the fact that the richer an individual is, the less his or her marginal desirability of money, it further follows that

the comparative desirability of two fortunes is much less than their money values would suggest. A man whose income has increased from $1000 to $10,000 a year is better off than when it was $1000 a year, but he is not ten times as well off. The extra $9000 may not be worth as much as the original $1000, in which case he is not even twice as well off. It is still truer that a man with a fortune of $500,000,000 is only slightly better off (if at all) than one with only $1,000,000. Were these facts better appreciated, "great riches," though desirable, would be less dazzling to those who have never possessed them.

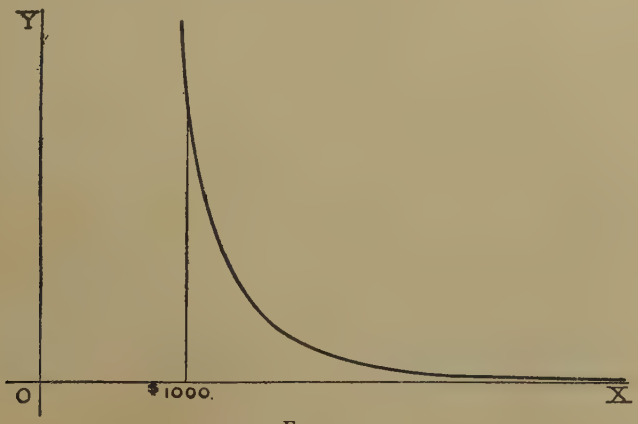


FIG. 31.

Figure 31, in which longitude represents income, and latitude its marginal desirability, expresses the fact that the marginal desirability of money (assuming a given purchasing power) decreases very rapidly with an increase in income; that is, the richer a person, the less — and very much less — he prizes an individual dollar. The curve probably continues to the right indefinitely, though growing closer and closer to the base; that is, no matter how rich a man becomes, an additional dollar will still have *some* desirability in his eyes. Man is literally insatiable.

(2) As to corrections between different price levels, we note that money wages in the United States are higher than in England; but it is misleading to make any comparisons unless we first correct for differences in the price levels or purchasing power of money. In some occupations it would seem that the difference in wages only just corresponds to the difference in the purchasing power of money, so that in those cases the American workman is really no better off than the English. He has more money wages, but its marginal desirability is so much less that he has no more desirable food, lodging, or comforts. In general, however, after all allowances are made for difference in price levels, the lot of the American workman is usually better than that of the English.

Desirability is, therefore, a far more fundamental concept than mere money value. This could not fail to be recognized if we had any practical means of measuring desirability. Unfortunately, as yet, we have no such means. As money values are usually measurable, we are often compelled to make our measurements in money or else make none at all. This must not, however, mislead us into attributing to money measures any greater significance than they actually possess.

CHAPTER XVII

INFLUENCES BEHIND SUPPLY

§ 1. Analogies between Supply and Demand

In the last chapter we have seen that a total demand schedule (or curve) for any particular good is derived from innumerable individual demand schedules (or curves), and that each individual demand schedule (or curve) is derived from a pair of desirability schedules (or curves), one relating to the marginal desirability of the particular good under consideration and the other relating to the marginal desirability of money.

With certain exceptions to be explained later, precisely these same propositions are true of the supply side of the market.

First of all, then, the total supply at any price is merely the sum of the individual supplies at that price, as illustrated in the following "supply schedules" for coal for two individuals. As before, we distinguish them as I and II (without meaning to imply, of course, that they are the same individuals as those called I and II in Chapter XVI).

Price	Supply Schedules. Tons which would be supplied by Individuals		Total ($a + b$)
	I (a)	II (b)	
$4	1500	2000	3500
5	1600	2400	4000
6	1800	3000	4800
7	2100	3900	6000

The last column gives the sum of the figures in the first two. If we should include in our table *all* supplies in the market, we should obtain in this way the *total* supply schedule. The same relations are indicated graphically in Figure 32, where $s_1 s'_1$ is the supply curve for coal of Individual I, *i.e.* a curve such that if the latitude of any point on it represents a given price, the longitude of that point will represent the amount of coal the individual is willing to supply at that price. Similarly, let $s_2 s'_2$ be the supply for coal of Individual II. If, as in the case of demand curves, we add longitudes (*e.g.* $Sy = s_1y + sy)_2$ we obtain SS' as the curve representing the total supply of both individuals.

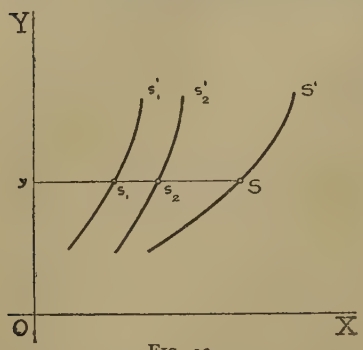


FIG. 32.

If in like manner we add together all the individual curves of all the individuals in the market, we obtain the total supply curve of the market.

Having thus derived the total supply schedule (or curve) from its constituent individual supply schedules (or curves), we next seek, as in the case of demand schedules (or curves), to derive each individual schedule (or curve) from a pair of desirability schedules (or curves).

The following table illustrates such a derivation. The figures in the last column, found from the other two by simple division, gives the prices a coal dealer would be willing to take in view of the desirability to him of the money he seeks to get by selling coal and the undesirability of the trouble and expense involved in getting it. If the 1500th ton costs him 8 units of desirability, and a dollar represents to him 2 units of desirability, he will evidently be willing to take $4 a ton up to the 1500th ton, and so on for the other figures in the table.

Tons Sold	Undesirability of supplying Last Ton (a)	Desirability of a Dollar (b)	Price the Dealer would be willing to Take ($a \div b$)
1500	8	2	$4
1600	10	2	5
1800	12	2	6
2100	14	2	7

The same relations may, of course, be represented graphically. In Figure 33, the latitudes of the points on the line, *rr'*, represent the undesirability per ton of parting with the coal, and those of the lower line *mm'* represent the desirability per dollar of obtaining money. The result of dividing the latitudes of the points of *rr'* by those of *mm'* (*i.e.* 2) gives us the supply curve *ss'*, the height of which at different points will be proportional to those of the curve *rr'*. The latitude of the curve *rr'* represents the undesirability of the efforts and sacrifices of furnishing each successive unit, or "marginal undesirability," and the latitude of the curve *ss'* represents this *marginal undesirability translated into money.* This marginal undesirability translated into money is usually referred to briefly as *marginal cost* of production or simply as *marginal cost.* It comprises everything undesirable involved in supplying the article under consideration, including all discounted future costs, the money equivalent of all labor and trouble, as well as all actual money expenses. The seller is more

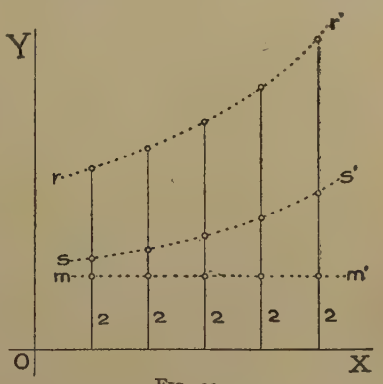


Fig. 33.

apt to think and talk in terms of money than the buyer, for the seller as such has more to do with money. Unless he is a mere workman, the only cost to whom is labor cost, most of his costs are in the form of money expenses.

§ 2. Principle of Marginal Cost

Hitherto we have treated the marginal desirability curve for money as a horizontal straight line. This was essentially true for the purchaser, but for the seller it is untrue. For the purchaser, money performs many offices besides buying coal, and its importance for the purchase of coal is not great. To the coal dealer, however, coal is the only thing he sells for money. To him, therefore, changes in the amount of coal sold and the price of coal will make a great difference to the total amount of money he gets and therefore to its marginal desirability. If, for instance, the price of coal changes a dollar a ton, though to the purchaser this fact will not appreciably affect the marginal desirability of money, to the seller it may make all the difference between poverty and affluence.

Consequently, in treating supply, we cannot continue to assume that the marginal desirability of money remains constant and can be represented by a horizontal straight line. Instead, the marginal desirability of money decreases the greater the sales, and therefore the more money is obtained. Consequently the line mm^1, representing marginal desirability of money, should descend to the right as the sales increase. Moreover, the descent of this curve mm' will depend on the price, so that we cannot even construct it until we specify a particular price. In Figure 34 these facts are taken into account, OP represents the assumed price, the curve rr', as before, represents marginal undesirability of furnishing coal, and the descending curve mm' represents the marginal desirability of the money obtained. We now use these two curves just as we did

those in Figure 33, and obtain the point *s*, the latitude of which is the assumed price *OP*, and the longitude the supply of the individual at that price. By changing *OP* and repeating the construction, we can obtain other points than *s*, thus constructing the supply curve showing the marginal cost of supplying different amounts of coal.

In the supply curve, as we have just constructed it, the price is a minimum relatively to the supply, and the supply a maximum relatively to the price; that is, the curve shows the lowest prices at which given amounts will be supplied, or the greatest amounts which will be supplied at given prices.

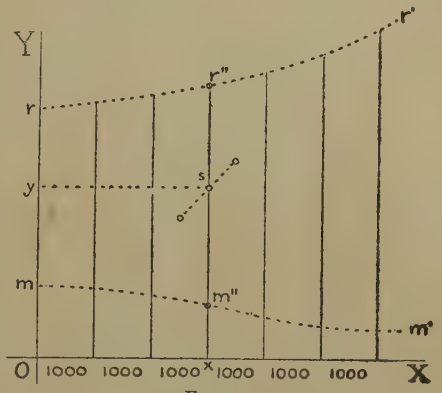


FIG. 34.

We see, then, that the total supply curve, analogously to the total demand curve, may be derived from a number of individual supply curves, and that each such individual supply curve may be derived by assuming successive prices, and for each price constructing (1) a curve of marginal undesirability of furnishing the article and (2) a descending curve of marginal desirability of money.

The important result is that the market price, as finally determined by supply and demand, is not only equal to the marginal desirability of getting coal for each buyer, but also to the marginal undesirability of furnishing it for each seller, both the desirabilities and undesirabilities being measured in terms of money.

Thus, if the price of coal is $5 a ton, the last ton bought by each buyer is worth barely $5 to him, while the last ton sold by each seller costs him about $5 worth of expense and trouble.

These equalities on the margin of all sales and purchases, and the fact that the price must be such as will equalize supply and demand, *i.e.* "*clear the market*," are the fundamental principles which determine the market price of any particular good.

Market price, then, is such a price as will equalize (in terms of money) all marginal desirabilities of buyers and all marginal undesirabilities of sellers, and at the same time equalize the total demand of all the buyers with the total supply of all the sellers. In short, market price results from the following two principles: —

(1) The equalization of all marginal desirabilities and undesirabilities (measured in money).

(2) The equalization of supply and demand.

We cannot neglect either of these two principles, nor can we omit either half of the first principle. It is a mistake to think that price can be determined by marginal desirability alone or by marginal undesirability alone. It takes two sides to make a bargain and a market price. The present chapter, however, is especially devoted to the supply side.

On the supply side of the market, therefore, the great determinant of market price (in terms of money) is *marginal cost* (in terms of money).

The same principle would, of course, apply in terms of any other good than money or in terms of general purchasing power. We have already had occasion to anticipate this principle when considering the production and consumption of gold and silver. The price or purchasing power of gold, we found, depends not only on gold as money, but also on gold as a commodity. In the latter case its supply and demand needs to be considered like those of any other commodity. That is, so far as gold is an individual commodity like silver or coal, the study of its price or purchasing power involves the principles which determine an individual price as well as the principles which determine the general level

of prices. Our present study of individual prices, therefore, throws light on our previous study of gold. If the student will return for a moment to Figures 10–13, he will see that the distance below the line *OO* of the highest outlet (in operation) from any bullion reservoir is simply what we would now call the marginal desirability of gold for use in the arts (measured in terms of general purchasing power over goods), and that the distance of the lowest inlet (in operation) is the marginal cost of production of gold (measured likewise in terms of general purchasing power over goods). We may now add that the differences in costs of producing gold, represented by the differences in heights of the inlets, are not altogether due to differences between mines, but also to differences in working the same mine. There is a marginal cost of production for each mine. The higher the speed of extracting, the higher the cost per ounce. This is called the law of increasing cost (per unit of product) or of diminishing returns (per unit of cost). It applies, of course, more generally than simply to gold and silver. We have taken coal as our typical example. We might have taken numerous other examples. If the price of wheat rises, its marginal cost will rise. Worse lands will be resorted to, and lands previously under cultivation will be worked more intensively until, on all wheat lands the cost (measured in money) of furnishing an additional bushel will be equal to the price.

§ 3. Upward Supply Curves which turn Back

In spite of the analogies we have noted between the supply and the demand side of the market, the differences between them are so great and important that the rest of this chapter will be devoted to them.

All demand curves descend to the right, and we have hitherto assumed that all supply curves ascend to the right. But not all supply curves do ascend to the right. One

peculiar type of supply curve grows out of the fact recently noted, that there is a separate and descending curve of marginal desirability of money. This fact, when combined with the ascending curve of desirability of coal, tends to bend the supply curve upward — sometimes so much as to cause it to curl back *to the left*, as in Figure 35. Such a curve, although it ascends, does not, throughout its course, ascend *to the right*. It applies especially to the supply of labor. The meaning of such a supply curve is that a rise of price does not always cause an increased supply. At first it does, but beyond the point where the curve begins to curl back a rise of price evidently results in *reducing* the supply.

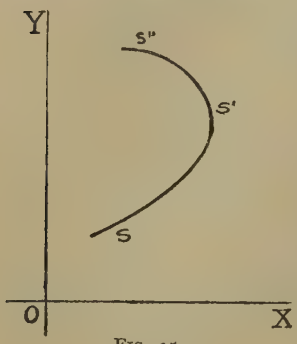


FIG. 35.

If we stop to consider the motives of a workingman, we shall see that this is true of him. If wages are low, a rise in them will at first stimulate the workman to work longer hours, but after a certain point he will prefer to rest on his oars. He earns so much in a few hours that he feels it is no longer necessary to work so hard. In South America, for instance, traders from Europe were once buying native-made baskets of a peculiar kind. In order to increase the supply of baskets, which was far less than they could market in Europe, the traders decided to raise the price that they would offer to the makers, thinking thereby to stimulate the production of baskets. Exactly the opposite result followed. As soon as these workmen were offered high prices for the baskets, they produced less than before; they could now get more money even for doing less work, and they didn't need or want more. Their wants were so few and simple that their marginal desirability of money decreased very rapidly with an increased amount of it.

That is, as the price rose from the height of s' to that of s'', the supply decreased from the longitude of s' to the longitude of s''. In the same way in the Philippine Islands it has been found that to raise the wages of workmen sometimes resulted in their working less hours in the day and less days in the year. One Spaniard, in order to keep his foreman, whom he considered very efficient, gave him a particularly high salary. The plan worked well for a few months, but at the end of that time the man had accumulated so much money that he had little desire for more, and decided to retire. Now this same principle applies to all labor. Experience indicates that as wages go up workmen demand shorter hours. The eight-hour movement of to-day is at bottom due to the fact that wages are high. When wages were low, men worked twelve hours a day; now that they are high, they work only ten, nine, or even eight, hours a day. The same principle explains why men with the highest salaries, instead of working longer hours than others, usually work shorter hours. The most highly paid grades work the fewest hours and take the longest vacations.

The exact point in wages at which the curve begins to bend back so that if wages are raised any higher the supply of work will diminish, depends on the particular conditions in each case, the size of the workman's family, the range and character of their wants or their "standard of living," and other similar conditions. The more wants a man has, the higher the point the curve begins to bend back, *i.e.* the less easily is he satisfied with more money. A curious instance in the Philippines is that workmen who have a taste for alcohol are sometimes more useful to their employers than those who are always sober, because those who want liquor have a larger range of desires and are therefore apt to work harder in order to get the drinkables they desire; whereas the sober man is contented merely to get enough food to eat, and will work only just long enough for that pur-

pose. A relatively slight rise of wages satisfies his wants so completely or so nearly completely that he does not consider any further wages worth the effort.

§ 4. Downward Supply Curves

The typical supply curve, with which we began, ascends continually to the right. In the exceptional case just considered, the rightward movement was arrested and turned into a leftward movement. Our next exceptional case is that in which the curve does not even ascend, but descends. Such descending supply curves are common under modern conditions of factory production. It is often found that a large product costs less trouble, per unit, than a small product. This is due to the fact that, in such cases, the marginal undesirability of furnishing the good decreases with an increase of supply, and not only decreases, but decreases in a faster ratio than does the marginal desirability of money; so that the ratio of the one to the other, *i.e.* the *marginal cost, decreases with an increase of supply.*

When marginal cost decreases with an increase of supply, the supply schedule (or curve) is no longer the schedule (or curve) of marginal costs, but must be constructed on an entirely new principle. The principle that market price is equal to marginal cost will no longer hold true. Only when the supply curve ascends will it be true that the price at which the seller is willing to supply a given amount is equal to its marginal cost, and is therefore derived from the curves of undesirability. Descending supply curves are derived entirely differently. They depend not on *marginal* cost at all, but on *average* cost. The reason is that no seller is willing to sell at a loss, and this is what he would be doing if he should offer to sell at prices corresponding to marginal cost when the marginal cost decreases with the amount sold. It is clear that, if the cost of supplying the 3000th ton of coal is $5, and the cost of all preceding tons is *greater*

than $5, not even one ton of coal could be sold at $5 a ton without a loss, and if 3000 tons were sold at that price there would be a loss on every ton except the last. Rather than sell 3000 tons or any less number at $5 a ton, the dealer would choose to sell none at all. Contrast this result with that which obtains in the case of an ascending curve. In this case the cost of supplying the 3000th ton was $5, but the cost of all preceding tons was *less* than $5, so that instead of a loss there was a profit on each of these preceding tons. Not only could he afford at $5 to sell 3000, but this amount gives him the maximum profit — more, for instance, than if he should sell 2000 or 4000 tons. In order that any dealer shall sell at all, he must expect to get back *at least* the total cost. This means that he must therefore charge a price *at least* as high as the *average* cost per ton. When the cost of each successive ton is *greater* than that of the preceding ton, the cost of the last, or marginal cost, is the greatest cost of all, and therefore exceeds the average cost. Consequently the dealer was assured a profit when selling at a price equal to the marginal cost. But when the cost of each successive ton is *less* than that of the preceding ton, the cost of the last (marginal cost) is the least of all, and therefore is less than the average cost.

In either case, then, the seller must get back at least the average cost and also at least the marginal cost. In short, he must get a price at least as high as *the higher of the two*. Whichever of the two is the higher will show itself in the supply curve. When the marginal cost increases with supply, marginal cost is the higher, and will rule supply. When the opposite is true, average cost is the higher, and will rule supply.

In the latter case the supply schedule (or curve) is a schedule (or curve) of average costs. We need not describe in detail how to construct such a schedule (or curve). This presents no difficulty, since we already know how to construct a schedule (or curve) of marginal costs which gives

the individual costs of each separate ton. The simple average of any specified number of these is the average cost of that number.

§ 5. Resulting Cutthroat Competition

But, besides the fact that the ascending supply schedules (or curves) are based on marginal costs, and descending supply schedules (or curves) are based on average costs, the two types of supply curves offer another and even more important point of contrast. The supply at a price is in the first case the *maximum* which the seller is willing to offer at that price, whereas in the second case it is the *minimum*. When we consider simply ascending types of supply, we may express the relation between the price and supply in two ways, either —

(1) Given the supply, the price is the *minimum* price at which that supply will be offered; or

(2) Given the price, the supply is the *maximum* which will be offered at that price.

The first of these two propositions still holds true when the supply descends instead of ascends; but the second will not hold true until we have changed the word "maximum" to "minimum." In other words, when, as originally supposed, the supply ascends, the seller is willing at any given price to supply a certain maximum amount *or less;* while, when the supply descends, he is willing at any given price to supply a certain minimum amount *or more*. In this respect, then, supply and demand are not analogous.

In the case of demand there were not two classes, one ascending and the other descending, but only one. In all cases demand decreases as price increases. Consequently there were not two ways of stating the relation between price and demand. The amount demanded at a price is always the *maximum* amount which will be taken at that

price; and the price is the *maximum* price which can be gotten for that amount.

Let us then summarize our results, expressing each on he basis of a given price.

1. At a given price, each buyer is willing to take a certain *maximum amount or less* at that price.
2. At a given price, each seller is willing
   (*a*) (in case marginal cost *increases* with an increase of supply) to offer a certain *maximum amount or less* at that price.
   (*b*) (in case marginal cost *decreases* with an increase of supply) to offer a certain *minimum amount or more* at that price.

The contrast between the two types of supply are illustrated graphically in Figures 36 and 37. Figure 36 illustrates case *a* and Figure 37, case *b*. The curve in the first case is seen to be the maximum limit of longitude, and in the second case the minimum limit. The longitude of any point in the shaded area represents an amount which the seller is willing to supply at the price corresponding to the latitude of that point. Thus, if we take any horizontal line in the shaded area of Figure 36, its latitude represents an assumed price, at which the seller is willing to supply any amount, from nothing at the left end of the line to the maximum amount at the right end where the horizontal line is limited by the curve. Taking any horizontal line in the shaded area of Figure 37, the seller is willing to supply any amount from the minimum at the curve, *i.e.* at the left end of the line, up to an indefinite amount at the right.

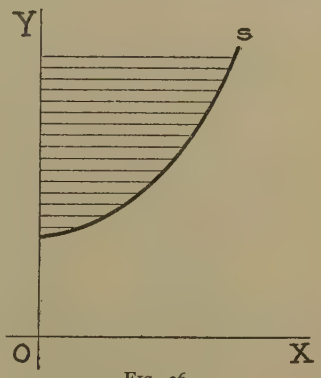


FIG. 36.

In the latter case, *i.e.* when the cost of each additional unit of product is less than that of the preceding unit, the more the seller can sell the better he likes it. If he sells only the minimum, he gets back only his average cost of production, and makes no profit. Any sales beyond this bring him a profit, and the larger the sales, the larger the profit.

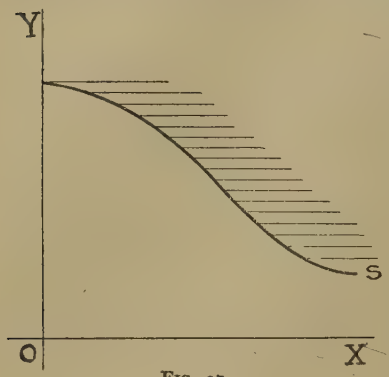


Fig. 37.

This fact introduces us to an unexpected conclusion, viz. that if the total supply curve descends, the price represented at the intersection of the supply and demand curves, although it clears the market, is *not* a stable price, but tends always to *fall*. Whether the price is above, at, or below, the latitude of the intersection, it will tend to fall so long as the supply curve descends. Let us consider each case separately. If the price (Fig. 38) is *OP*, higher than the intersection, the demand exceeds the *minimum* supply and stimulates each supplier to furnish more than his minimum, which, of course, he is only too glad to do. Consequently, the supply will soon overtake demand. Those competing to supply will strive to underbid each other, and the price will fall.

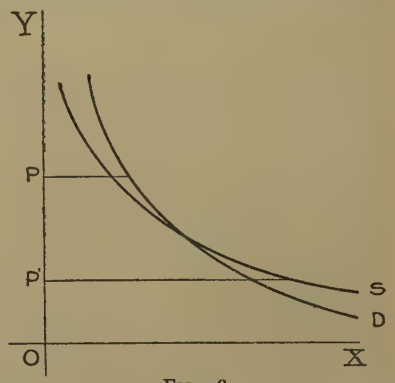


Fig. 38.

But it will not stop falling at the intersection. Suppose it is below, as at *OP'*, it will continue to fall. For then even

the minimum supply exceeds the demand, and all who compete to supply will be very eager not to be left with unsold goods on their hands. A rise of price would, it is true, remedy the difficulty. But no *individual* can apply this remedy, and there is, by hypothesis, no combination. The individual competitor cannot raise prices without securing the agreement of others; but to do this would be to create a combination which is contrary to our present hypothesis of independent action. If he should individually raise his price, he would be committing commercial suicide, for no people would buy of him when they could buy more cheaply of his competitors. His only hope of achieving his purpose of increased sales lies in adopting the opposite course, and underselling his competitors regardless of the consequences to them and to the market price. He hopes that, before they can meet his cut in price, he may win the patronage he needs to make it worth his while to stay in the market, and that he may thus drive some of his competitors out of business. If he fails to get the needed patronage, he must go out of business himself. He therefore offers his wares at a price below OP'. But, as we have seen, there cannot be two prices in the same market at the same time. Hence all his competitors must reduce their prices, to his.

Whatever the effect of this action may be on the individual who first cuts the price, the result on the whole is evidently to make matters worse; for, according to conditions shown in the diagram, the lower the price, the more will the supply exceed the demand.

We have here what is known as "cutthroat competition" or a "rate war," *i.e.* competition the effect of which is not simply to reduce profits but to create losses.

§ 6. Resulting Tendency toward Monopoly

But we have not yet reached the ultimate result of such competition. Some competitors must sooner or later see

that there is no hope to secure the large sales necessary to make business worth while. They withdraw. This reduces the losses for the rest; for, by removing their supply curves, the total supply curve is reduced in longitude, and the discrepancy between supply and demand is lessened if not done away with entirely. But even so, the tendency of the price to fall is not hindered, for we have seen that, as long as the supply curve decreases, competition forces the prices down on whatever side of the intersection the price may be. In the case of a descending supply curve, the intersection has nothing to do with the case. Competition with descending supply curves will always lower the price so long as there are *any* competitors with descending supply curves. No check to this fall is possible until either competition ceases or the supply curve ceases to descend. If the supply curve at some point at the right reaches a minimum point, this marks the lowest point to which the price can fall; or if the crowding out of competitors finally leaves only one supplier in the field, he at that moment becomes a monopolist, and the prices will cease falling on that account.

Monopoly may also come about in another way, as already suggested, *i.e.* by combination. When there is cutthroat competition, the motive to combine is strong. None of the competitors relish the prospect of being crowded out any more than they relish the prospect of continued cutthroat competition. Whether combination will actually result or not depends on a variety of circumstances. One or more of the competitors may flatter himself that the rate war will end in crowding out all others except him, and prefer to keep up the fight to the bitter end. Others may keep on from other motives, being prevented by pride or resentment either from withdrawing from the contest or from begging their rivals to form a combination. But for our present purpose it does not matter much whether the monopoly which finally results comes from the final survival

of one supplier or from deliberate combination. In either case the result is monopoly.

We find, then, as a result of our study of the supply side of the market that supply curves sometimes descend, and that in such cases competition is "cutthroat" competition, and results in losses and tends toward monopoly.

In all our reasoning we have assumed perfect competition to start with. It should be noted that in actual fact competition is usually somewhat imperfect. The slight undercutting of price by one grocer will not ruin the trade of another in another part of the same town for the reason that the two are not absolutely in the same market. Each has a sphere which the other can only partially reach, partly because of distance and partly because each has his own "custom," *i.e.* the patronage of people who, from habit or from other reasons, would not change grocers merely because of a slight difference in price. Thus each is protected by his partial isolation. So that even when supply curves descend, competition may be so limited as to prevent any very fierce rate war, the rate war being prevented by partial or local monopolies among the suppliers in the first place. A rate war, therefore, is never a permanent or normal condition. If not avoided at first by imperfect competition or by partial monopoly, it is avoided eventually by the monopoly to which it leads.

§ 7. Fixed and Running Costs

We have now to notice another peculiarity on the supply side of the market. The peculiarity referred to is the fact that there are often costs which do not vary with supply, but remain unchanged whether the supply is large or small or nothing. These are called the *fixed* costs as contrasted with the costs which vary with supply, which are called the *running* costs. If all costs are in the form of actual money expenses, the two classes are also called respectively *fixed*

expenses and *running expenses*. The fixed expenses of a railway company, for instance, consist of the interest on its bonds. The running expenses consist of the salaries, wages, fuel, materials, etc. The only costs hitherto included in our discussions were running costs. The fixed costs were not included because they have no effect on supply schedules (or curves). Our only purpose now in studying fixed costs is to show that they do *not* have any effect on supply, a fact at first surprising.

In general, fixed costs of production of any given goods consist simply of *interest on past costs* which have been " sunk " in the business, *i.e.* which cannot now be reimbursed to the owner except as the sale of these said goods may do so in part or in whole. As we have seen in a previous chapter, interest is not a cost to society, for it is merely a payment from one person to another. To society as a whole the only cost is the " sunk " cost, which, in the last analysis consists, as has been explained, of the labor expended at various times in the past. But to the individual supplier — and his is the only cost in which we are at present interested — interest is a cost. If he pays no interest, he must have incurred the " sunk " cost himself, in which case this past sunk cost replaces the fixed annual cost. In one of the two ways he must bear the burden of sunk cost. That is, either he must have borne it in the past directly, or he must now be paying interest to some one else who so bore it. The two ways are equivalent in the same sense that two goods are equivalent which exchange for one another. That is, a sunk cost of $100,000 is equivalent, if interest is 5 per cent, to a fixed cost of $5000 a year. Whether the individual person or company has sunk the $100,000 in the past or is paying $5000 a year to some one else who did, — in neither case does this cost enter into the cost (or undesirability) curve, or the resultant supply curve or the resultant price.

We shall cite some examples which have been almost literally realized in actual life. A man once sunk some

$100,000 in a hotel on the top of a mountain. He found that so few guests wanted to go there that the most he could earn was only $2000 beyond his running expenses. He never succeeded in recovering the sunk cost, and the fact that he had sunk $100,000 gave him no power to command prices high enough to enable him to succeed. Nor could he withdraw from the business and recover his $100,000. His total building was worth nothing except for hotel purposes. He could only make the best of his misinvestment and run his hotel for the sake of $2000 a year. This was better than nothing at all, which would have been the result of going out of business. The $100,000 sunk in the past was sunk just the same, whether the hotel was run or not. Another hotel keeper borrowed $100,000 on bonds and paid interest at 5 per cent, *i.e.* $5000 a year to the bondholders. His business paid running costs, but only $2000 beyond those costs, so that he failed by $3000 to earn enough to pay his interest to the bondholders. The hotel was losing, in actual money expended, $3000 a year. But even in this case the hotel could not be abandoned. The only result was to change owners. The bondholders foreclosed their mortgage and ran the hotel themselves. As it still earned $2000 beyond running expenses, they found it more profitable to continue the business than to close out.

In either of these two cases, whether the hotel was built by the owner out of his own purse or out of borrowed money, there was a loss equivalent to three fifths of the original cost, or what amounts to the same thing, the interest thereon. Yet this cost could not be avoided, whether the hotel business were large or small or abandoned altogether, and it "paid" to run at a loss rather than to close down at a greater loss. This paradox, that "it sometimes pays to run at a loss," is important to analyze and to understand.

A third hotel keeper made a lucky hit in his $100,000. He got not only his running expenses and interest on the

$100,000, but a handsome profit besides. But this fact did not affect the prices at which he was willing to supply accommodations.

The point to be emphasized is that in all three cases the fixed costs had no influence on prices. Whether these costs are easy to carry, as in the last case, or burdensome, as in the other two, they have no influence on prices. In each case the owner tries to make the most he can. The fixed costs take out the same amount, whatever he does, and may therefore be disregarded in deciding what is best to do.

It follows that fixed costs will not even prevent prices, under the stress of competition, from going below what will pay those costs. A railway may be making money enough to pay both its running and fixed expenses and a handsome surplus besides, until a parallel road is built. Then each tries to take business away from the other; a rate war ensues, and prices of freight and passenger services are driven down. Each road is now running behind on its interest payments, yet neither can afford to stop running, for then it would run behind still further. We have here the same cutthroat competition as when the supply curve descends, except that in this case it is "cutthroat" because of the fixed costs. If also the supply curve descends, then there are two conditions tending toward cutthroat competition, *i.e.* the existence of fixed costs and the existence of descending supply. As a matter of fact, these two conditions are often united.

§ 8. General and Particular Running Costs

The two are not only often associated, but are at bottom very similar to each other. This may be seen best if we divide one of our classes of costs, running costs, into two subclasses, "general" costs and "particular" costs. By general costs, also called "overhead costs," are meant costs which, though they could be gotten rid of if the business ceased, will not greatly vary whether the business is large

or small. They include the labor of superintendence, salaries of the chief officers, rent of rented quarters, interest on short-time loans for stock carried, etc., power, lighting and heating, insurance and repairs. By particular costs — also called ratable or distributive costs — are meant costs which vary almost or quite in proportion to the amount of product sold. They include raw materials and cost of ordinary wages.

Now when the supply curve descends, *i.e.* when running costs decrease with increase of supply, the reason is usually found in the " general costs." As the total " general costs " remain little changed by an extension of the supply, the general costs *per unit* supplied grows smaller, the larger the supply. These costs, added to the particular costs, which remain practically the same, evidently cause the total running cost per unit to decline with an increase in production.

Now the reason that fixed costs were not treated like general costs, and included in the computation of the average cost per unit, was because, as we have seen, fixed costs could make no difference to the price at which the supplier is willing to supply a given amount, to show which is the object of the supply schedule (or curve). The supplier is *not* willing to sell at prices below what is necessary to cover general costs, for he has the option to escape these general expenses by going out of business entirely. But he *is* willing, if need be, to sell at prices below what is necessary to cover fixed costs; for from these there is no way of escape. He might have escaped them once had he not made the original investment, but now it is too late. The difference between fixed and general expenses, then, is chiefly one of dates. When a man is contemplating building a hotel, and forecasting his possible profits or losses, he will try to make his prices cover fixed costs; for they are then in the future; but after the hotel is built, he will no longer do this. The fixed costs are then past and beyond recall, and he must let bygones be bygones.

Since, then, his cost and supply curves are independent of fixed costs, the price which results from this supply curve and the demand curve will be independent also. This conclusion is consistent with what has been said in previous chapters as to price and value being dependent on the future and not on the past. We have seen that, on the demand side, people who buy any good buy it on the basis of what benefit it will do them in the future; now we see that, on the supply side, those who sell it, sell it on the basis of what it will cost them in the future to continue in the business, and not on the basis of costs which were sunk in the past. The principle has been stated (somewhat imperfectly) as follows:—

"The price of any article is not determined by its cost of production, but by its benefits." The imperfection in this statement is its failure to discriminate past from future. The costs of production, if they be *future*, do enter into value, precisely as future benefits enter. Future costs are estimated in advance just as future benefits are. For instance, the value of the Panama Canal to-day is dependent upon its future expected benefits, taken in connection with the future expected cost of completion. Past elements are without significance. The future elements being given, the value of the canal will be the same whether the past cost was large or small, or nothing at all. Of course it is true that the future expected cost for completing the canal is less than if some of the work had not been already accomplished, so that the greater the past cost has been, the less the future cost ought to be, and hence the greater the present value of the canal.

§ 9. Monopoly Price

The supreme principle which guides economic action is the principle of maximum gain. This principle applies both to competition and monopoly, but its application is different

in the two cases. In the case of competition the price set by competitors is an important element which must be reckoned with, while in the case of monopoly this element is lacking. In fact, monopoly is best defined as *absence of competition.*

In explaining the principle on which monopoly price is fixed, we shall first assume that competition is entirely absent, there being no fear even that high prices will lead to competition in the future.

Under these circumstances the monopolist will adjust his price to what he thinks will be the effect on demand. He will charge " all the traffic will bear," *i.e.* will put up his price to the point which will give him a maximum profit over cost. The higher the price, the larger the profit *per unit* sold. But the higher the price, the less the demand, *i.e.* the sales he can make at that price. If he makes his price too high, he kills the sales. If he makes it too low, he kills his profit per unit. By trial and error or by exercise of his best judgment, he steers a middle course, and selects that price which he thinks will render his profit a maximum.

In general, the price under monopoly will be higher than under competition, but this will not always be the case if, as often happens, the costs under monopoly are less than the costs under competition. In some cases monopoly results in lowering costs so much that the greatest profit is secured by setting the price lower than under competition. Such economies in cost come from getting rid of duplications in plant, management, and advertising, and by giving the advantages in general of large-scale production.

When monopoly price exceeds price under competition, there is usually danger that the high price will invite competition. Practically such danger is seldom absent. Competition which is feared, but not in actual existence, is called potential competition. This potential competition has an effect similar to real competition, so that under monopoly the price is usually not quite " *all* the traffic will bear," but

something between that and the price that would result from actual competition. In general, prices are seldom determined under conditions either of perfect monopoly or of perfect competition. There is usually a partial monopoly or, what is the same thing, imperfect competition.

There are many and obvious evils in monopoly. The evils of high prices are the least of these. There are the evils of crushing competitors by lowering prices and then raising them afterward; the evils of discrimination, or charging different prices to different persons or localities; and there are the dangers of political corruption and control. The reader will have an opportunity in other books to study these evils and the proposed remedies. He should, however, avoid the common but false conclusion that all monopolies are evil. In fact, a chief lesson from this chapter is that, on the contrary, competition is sometimes an evil, *i.e.* when it is of the cutthroat kind, for which some form of monopoly is the only remedy. When any business involves a large sunk cost or has a descending cost curve, and therefore a descending supply curve, competition becomes of the cutthroat kind. Even if we refrain from sympathy for those producers who lose by such competition, we must not fail to note that in the end consumers will lose also. The reason is that when cutthroat competition is feared, producers will avoid sinking capital in such enterprises. It is largely in recognition of this fact and in order to encourage such investment that patents and copyrights are given. These are monopolies expressly fostered by the government. Herbert Spencer once invented an excellent invalid chair, and, thinking to give it to the world without recompense to himself, did not patent it. The result was that no manufacturers dared risk undertaking its manufacture. Each knew that if it succeeded, competitors would spring up and rob them of most or all of their profits, while, on the other hand, it might fail. Enforced railway competition has sometimes resulted in killing railway enterprise.

The rise of trusts, pools, and rate agreements is largely due to the necessity of protection from competition, precisely analogous to the protection given by patents and copyrights.

Combinations are largely the result of the two conditions we have been considering, — the fact that the supply curve descends, and the fact that there is large invested capital. The anti-trust movement does not take these facts into account, nor does it understand the necessities which have led to monopoly and that, if we do not allow trade agreements, trade is practically impossible to-day.

CHAPTER XVIII

MUTUALLY RELATED PRICES

§ 1. Prices of Competing Articles on the Demand Side

We have seen how the price of any particular good is determined under varying conditions of competition and under monopoly. In each case the particular price has been considered, quite apart from other prices. We found that each price was determined by its own supply and demand. But "supply and demand" were expressed by schedules or (curves) which in turn depend upon schedules of desirability which themselves depend on innumerable outside conditions — included among them being the prices of other articles besides the particular articles in question. In fact, we have seen that these separate curves are affected by the general level of prices. We now have to observe that they are also particularly affected by other prices.

It is evident that the price of coal will affect the demand for coke, for coal and coke are often substitutes, or competing articles. Two sorts of wealth are said to be substitutes when they fill similar needs. It follows that the satisfaction of these needs by one of the two substitutes not only reduces its marginal desirability, but affects the marginal desirability of the other in a similar fashion. Consequently the marginal desirabilities of the two tend to fall or rise in unison. Consequently also the prices of the two tend to fall or rise together. The more nearly either of the two articles comes to filling the office of the other, the more closely do their prices keep pace with each other. If two articles are absolutely perfect substitutes, they are to

all intents and purposes the same article, and have the same price.

Hitherto we have regarded the schedule (or curve) of marginal desirability of any article as an ultimate fact or in our analysis. But behind it lie innumerable determining causes, and one of the most important is the prices of substitutes available.

There is scarcely an article which does not have its substitutes. The two fuel substitutes, coal and coke, include numerous subclasses and varieties, such as anthracite and bituminous coal. Other fuel substitutes are wood, petroleum, gasoline, alcohol, and gas. A change in the price of any one of these tends to produce a similar change in the prices of the rest. Likewise the prices of food substitutes are sympathetic — the prices of such substitutes as wheat, corn, oats, rice, and barley; of fish, meat, and fowl; of the various fruits and the various vegetables; or of clothing substitutes, such as woolen, cotton, linen, and silk; or of ornamental substitutes, such as diamonds, pearls, rubies, and amethysts. The closest substitutes, though still sufficiently distinguishable to prevent their being quite classed as the same article, are the various "qualities," "grades," or "brands" of any particular class of articles. There are many grades of wheat, of sugar, of coffee, of meat, of silk, and in fact of almost any class of articles which can be named. Among different grades the prices are usually so closely parallel that trade journals often give the price of one staple grade only,[1] — as of a standard grade of coffee, — leaving it to the reader to infer what the prices of the other grades must be. But the prices of different qualities of any good, though they rise and fall together, may be wide apart among themselves. Various qualities of land, for instance, bring very different prices, ranging from almost nothing to thousands of dollars per square foot. When the various "qualities" yield precisely the same sort of benefit, the only differences among them are differences in the quan-

tities of benefits which flow from them. In this case the prices of the goods will evidently be proportioned to the quantities of benefits they yield. Wheat lands, for instance, of different fertility, will be worth prices proportioned to the quantities of wheat which they yield.

From what has been said of substitutes, it would evidently be a mistake to think that the price of each different article can be determined independently, *i.e.* without reference to the prices of other articles.

§ 2. Prices of Completing Goods on the Demand Side

Substitutes may be called *competing* articles. We now consider *completing* articles. Completing articles are articles which *jointly* serve the same want. We have seen that of two competing articles one is used *instead of* the other for a given purpose. But of two completing articles one is used *in conjunction with* the other for a given purpose. Horses and mules are *competing* instruments for the purpose of drawing loads. A horse and a cart are *completing* instruments for the same purpose. We have seen that the essential attribute of competing articles was the tendency of their marginal desirabilities to keep pace with each other, and the consequent tendency of their prices to correspond. In the case of completing articles it is the quantities of the articles which tend to maintain a constant ratio. In the case of perfect competing articles the ratio of their prices is absolutely constant. In the case of perfect completing articles the ratio of the units used is absolutely constant. Right and left shoes, for instance, being, practically speaking, perfect completing articles, the *numbers* of rights and lefts keep in a ratio of equality. One-legged people are too few to seriously modify that relation. The prices of two competing articles tend to move sympathetically, but the prices of two completing articles tend to move inversely. If horses are abundant and therefore cheap, the tendency is

to make the competing mules cheap also, but to make the completing carts dear; for the more horses used, the more carts will be needed, and the increased demand for them will tend to raise the price.

Articles which are related to each other as completing are almost as common as those which relate to each other as competing. Various articles of food are used in combination, as, for instance, bread and butter, or the elements of which a sandwich is composed. A daily diet is usually constructed with regard to the fitting together of the different courses served, and of the meals as a whole. Similarly, the various parts of one's wardrobe are arranged with reference to each other, and again, a dwelling and its various furnishings are mutually adapted. The tables and chairs, crockery, knives, and forks, beds and bedding, rugs and wall-paper, are all arranged in relation to each other and to the house which they furnish.

§ 3. Similar Relations on the Supply Side

Thus far we have considered only goods which compete with each other, or complete each other in respect to demand. Turning now to the supply side of the market, we find similar relations.

Two goods compete in supply when they occasion similar efforts or costs to those who sell them. Thus, hay and wheat — though far from being substitutes on the demand side, for they fulfill dissimilar wants — are to some extent substitutes on the supply side, for they require similar costs. Both require the use of farm land and the labor of mowing or reaping. The prices of such articles competing in supply, like those of articles competing in demand, tend to rise or fall together. The best example is found in the services of laborers. The wages, or the prices paid for various kinds of work, tend to keep pace with each other. Man is so versatile a machine that one kind of workman can readily sub-

stitute for another. On a pinch, the same man may be a factory employee, a farm hand, a coachman, carpenter, mason, plumber, or clerk. Consequently, these various sorts of work, though filling very unlike wants on the demand side, compete on the supply side, and tend to bear similar prices. If the wages of clerks rise, the wages of carpenters will rise also, because otherwise many carpenters would want to become clerks. The consequence is that wages of all sorts usually rise or fall together. If labor of all kinds could be perfectly substituted, wages of all kinds would remain in absolutely fixed ratios to each other, *i.e.* would rise or fall together in exactly the same ratios. Such "perfect mobility of labor," however, never exists. On the contrary, labor may be classified into several more or less "non-competing groups," such as brain work, skilled work, and unskilled work.

Two goods *complete* each other in supply when jointly they involve the same cost, *i.e.* when the supply of one tends to carry with it the supply of the other. The less important of the two is then called the *by-product* of the other. Tallow is a by-product of beef and hides. Other examples of articles completing each other in supply are mutton and veal; coal, coke, and gas.

The prices of two completing goods on the supply side tend to move in opposite directions, just as we saw was the case on the other side of the market. Consider, for instance, beef and hides. If the price of beef rises, the amount supplied at the higher price will increase. Hence the supply of hides will be increased at the same time. Consequently its price will fall.

We see therefore, that two articles may be competing on the demand side by replacing each other in satisfying the same desires, or on the supply side by requiring the same sort of costs; and also that they may be competing on the demand side by jointly satisfying the same desire, or on the supply side by jointly requiring the same costs.

In all the cases thus far considered, the relationship between articles is on the same side of the market. We next proceed to consider goods, the relation between which involves both sides of the market.

§ 4. Prices of "Tandem" Goods

The supply of one article may have relationship to the demand of another. This is true of two articles, one of which is used in producing the other. Such goods may be called "tandem" goods because one follows after the other. In this respect their relationship differs from the others discussed. Substitutes are, as it were, "abreast" of each other, whereas wool and woolen cloth, for instance, go tandem. Wool is used (as raw material) in producing woolen cloth. Hence the prices of wool and woolen cloth are intimately related to each other. The relation, however, is different from those relations hitherto considered. Wool and woolen cloth are not competing or completing goods on either side of the market. Their relation consists in the fact that the producers or sellers of woolen cloth are the consumers or buyers of wool. Both the demand and the supply side are involved. They *demand* wool to *supply* woolen cloth.

The prices of tandem goods move in sympathy. It is evident, for instance, that given a high price for wool, the prices in the supply schedule (or curve) for woolen cloth will be higher than otherwise, and as a consequence the market price of woolen cloth will rise. Conversely, given a high price for woolen cloth, the prices in the demand schedule (or curve) for wool will be higher than otherwise, and as a consequence the market price of wool will rise. Thus, any change in price of either of these two articles will tend, sooner or later, to make the price of the other move in the same direction.

In the same way cotton and cotton cloth are tandem

articles, and their prices are likely to move in sympathy with one another; likewise the prices of wood and houses; of wheat, flour, and bread, or of iron mines, iron ore, pig iron, rolled iron, steel, steel rails, and railways. This chain-like or serial relationship comprises other elements than raw materials and finished products. Thus, steel is related to the labor and coal consumed in its manufacture in much the same way as it is to the iron ore out of which it is wrought. The price of steel therefore moves in sympathy not only with the price of iron but with that of the coal and labor as well as of all the other goods employed in its production. The series or chain of tandem goods is the chain of productive processes already discussed.

§ 5. Efforts and Satisfactions the Ultimate Factors

This tandem relationship enables us to see clearly the fact that, at bottom, supply rests on efforts, and demand on satisfactions. We have seen in economic accounting that all items of income and outgo cancel among themselves, except efforts and satisfactions. We now see this same truth in its application to supply and demand. As simple as this truth is, it is commonly overlooked because people are blinded by the all-pervading presence of money receipts and expenses. The business man, reckoning in money, comes to think of money expenses and money receipts as though they were real costs and benefits in the productive process, whereas they are only the representatives of real costs (efforts) and real benefits (satisfactions). We disentangle ourselves from the meshes of this money snare when we see that the controlling factors in determining prices are satisfactions on the demand side and efforts on the supply side. Between efforts and satisfactions there may be innumerable intermediate stages, at each one of which supply and demand results in a market price, but each such price represents simply anticipated satisfactions

or efforts translated into money valuations. Any dealer at intermediate stages, between efforts preceding him and satisfactions following after, has but little independent influence on price. He is like a link in a chain or a cogwheel in a machine, merely receiving and transmitting. If some *real* cost of production, earlier in the chain, *i.e.* some effort (or labor) is saved, he receives the cheapening effect from those of whom he buys, and passes it on to those to whom he sells. If some *real* benefit is reduced, *i.e.* some satisfaction diminished, as by a change of fashion, he receives the effect from those to whom he sells, and passes it back to those from whom he buys. The supply and demand of wheat, in the Chicago wheat pit, for instance, is chiefly dependent on the labor of wheat growing or the satisfaction of bread eating. If a new labor-saving reaping machine is devised which reduces the actual effort of producing wheat, the effect is soon felt by the Chicago wheat dealer and transmitted to his customer. Or if people turn to a rice diet and no longer care much for bread eating, this effect is also soon felt by the Chicago dealer and passed back to the wheat producer.

An intermediate dealer may not know the ultimate causes of the changes in supply and demand which affect his business on either side, and sometimes he does not try to think beyond what he immediately observes. He is apt to be content to explain simply one of the two prices which interests him in terms of the other. Wholesale merchants often offer to their customers, the retailers, as an explanation of the rise in their charges, the fact that they have to pay higher prices to the jobber; or again, they may offer to the jobber as an explanation of the fact that they cannot pay as much as before, that they cannot get as much from the retailers. Any such explanation of prices is shallow, for it goes no farther than explaining one price by another.

We see, then, that everything intermediate which happens in the economic machinery represents merely steps

in the connection between effort and satisfaction. When Robinson Crusoe supplied his wants, there was a direct connection between his effort in picking berries, for instance, and the satisfaction of eating them. To-day there are a number of links between these, but the same principle still applies. Supply and demand at intermediate points is borrowed from efforts and satisfactions.

CHAPTER XIX

INTEREST AND MONEY

§ 1. The Importance of Interest

We have seen that, in the last analysis, prices depend on comparisons between satisfactions or efforts or both. But, since these satisfactions and efforts are not all simultaneous, but are distributed in time, their comparison requires us to take account of interest. Consequently our study of prices will not be complete without a study of the rate of interest. It is only by means of the rate of interest, explicitly or implicitly employed, that the prices of most goods are reckoned. The rate of interest, as previously explained, is itself a sort of price. And it is by far the most important sort of price with which economics has to deal.

Most people have an idea that the rate of interest is a technical Wall Street phenomenon, not concerning any one but money lenders or borrowers. This is partially true of explicit or contract interest. But there is implicit interest to be considered. An explicit rate of interest is the rate of interest explicitly stated in a contract. An implicit rate of interest is the rate of interest realized by an investor who makes sacrifices at one time for the sake of compensating benefits at a later time. Implicit interest is also called profits. If we invest in a bond, for instance, the price that we pay carries with it the implication of a rate of interest we expect to realize on the investment. The implicit rate of interest, or the rate which we realize, is that rate of interest which, when used for discounting the income of the bond, will give the price at which we bought the bond. For instance, if a bond yielding $4 a year for 10 years, and then

redeemable for $100, sells now for $105, we know the rate of interest realized is not 4 per cent, as it would be if it sold at par. It is less than 4 per cent — about 3.6 per cent. The implicit rate of interest we realize on such a bond may be found, as we have already seen, from a mathematical table. When a man buys stocks instead of bonds, or a house or a piece of land, the same element of implicit interest enters into the transaction. He cannot even buy a piano or an overcoat or a hat without discounting the value of the use which he expects to get out of it. The rate of interest, then, is not confined to Wall Street, but is something that touches the daily life of us all.

How, then, is this important magnitude, the rate of interest, determined? The problem of interest is one of the most perplexing problems with which economic science has had to deal, and for two thousand years people have been trying to solve the riddle.

§ 2. A Common Money Fallacy

Among the earliest explanations of the rate of interest was that it is a payment simply for money, and that consequently it depends upon the quantity of money on the market. In particular, this theory of interest claims that plentiful money makes the rate of interest low. We commonly speak of interest as the "price of money," and the trade journals tell us that "money is easy" in Wall Street, meaning that interest is low or that it is easy to borrow money. Or we are told that "the money market is tight," meaning that it is hard to borrow money. Probably the great majority of unthinking business men believe that interest is low when money is plentiful, and high when money is scarce. We often hear the argument that the present high cost of living cannot be due to any plentifulness of money, because, if money were really plentiful, it would be cheap, meaning that the rate of interest would be low.

The fallacy consists in forgetting that plentiful money raises the demand for loans just as much as it raises the supply. If, for instance, a dealer in pianos wishes to borrow in order to stock up his store with pianos, supposing that the price of pianos is $200 apiece, and that he wishes to have a stock of 50 pianos in his salesroom, he evidently will have to borrow $10,000. He goes to the bank and borrows it. Now, let us suppose that money becomes more abundant. This man will have an idea that in some way he will get a lower rate of interest at the bank because, he reasons, the bank will have more money in its vaults and will be more anxious to lend it out. What he forgets is that the result of money being more abundant will be that prices in general will rise, and presumably the price of pianos in particular will rise; therefore, in order to get 50 pianos, he will have to borrow twice as much money to enable him to pay for his pianos at the doubled prices. In order to buy 50 pianos, he will need $20,000 instead of $10,000. Likewise every other borrowing tradesman will need to have twice as much money to conduct the same business. The fact that the banker has twice as much money to lend is therefore completely offset by the fact that the borrowers will want to borrow twice as much. The consequence is that doubling the amount of money will not affect the rate of interest in the least. It will simply affect the amount of money lent and borrowed. We must remember that interest is not only the price *of* money, but it is the price *in* money. Interest is unlike any other price in that it is the price *of* money, but it is like all other prices in that it is the price *in* money. Thus the rate of interest is found by dividing $5 per year by $100. Both the numerator and the denominator of this fraction are expressed in terms of money. If we pay attention only to the denominator, we are apt to think that an increased supply of money should decrease the rate of interest. But if we are to have a one-sided view, we might just as well fix our attention only on

the numerator, and maintain that an increased quantity of money ought, instead of decreasing the rate of interest, to increase it. The truth is, inflation of money works equally on both sides. In mechanics one of the first things we learn is that a man cannot raise himself by pulling up on his boot straps. The reason is that he is pulling himself down as much as up. The inflation of the currency pulls interest up on the demand side as hard as it pulls it down on the supply side.

We should beware of the phrase "the price of money," for it has two meanings. It may mean the *rate of interest*, which is a ratio of exchange between two moneys, the price of money capital in terms of money income; or it may mean the *purchasing power* of money over other goods. The abundance of money will, as we have seen, reduce its price in the sense of purchasing power over goods, but it need not on that account reduce its price in the sense of the rate of interest. Yet the idea that the plentifulness of money tends to make interest low is a persistent one among business men.

One reason for this idea is that bankers look upon money always in relation to their reserves, and if bank reserves are low, they have to raise the rate of interest to "protect" those reserves. If the reserves are abundant, bankers reduce the rate of interest in order to get rid of the reserve. The banker is constantly watching his reserve, and has to adjust the rate of interest with respect to this reserve. The only way to get rid of a plethora of money in the reserves is to lower the rate of interest, and the only way to protect a depleted reserve is to raise the rate of interest. But the banker is unconsciously measuring the amount of money in his bank relatively to the amount of money outside. What he forgets is that more reserves in his vaults does not necessarily mean plentiful money, nor when we have, as at present, for instance, a great quantity of money throughout the world, does this fact necessarily imply that Banker Smith

will have more gold in his vaults. The money may get into the pockets of people first; it may in that way raise prices so high that the borrowers at banks may demand, for the reasons explained, larger loans. And yet, if for some reason a due share of the money does not at first flow into the banks, the results will be that Banker Smith will have too little reserve in relation to the greater loans that are now demanded of him. The consequence, then, will be actually to *raise* the rate of interest. When, therefore, the banker says that more money lowers the rate of interest, he ought to say, "When bank reserves get an undue fraction of money, the rate of interest will be low; but when an undue fraction goes into circulation outside of banks, the rate of interest will be high." In other words, an increase of money will operate in two different ways, according to where it happens to go first. Normally and eventually, as we have seen in a previous chapter, an increase of money distributes itself between pockets, tills, and bank reserves, so as not to disturb the normal ratio between them. If *this* happens, then the rate of interest will not be affected at all, which is the normal result.

This conclusion is not based merely on theory. As a matter of statistical fact, the rate of interest does not go up when money is scarce and down when money is abundant. For instance, an examination of the figures for per capita circulation of money in the United States for thirty-five years shows that in about half of the cases, when money grows more abundant, interest is higher, and in half of the cases it is lower. In other words, interest moves with absolutely no relation to the quantity of money in circulation.

§ 3. Effect during Appreciation or Depreciation

We conclude, then, that an inflation of the currency does not affect the rate of interest, *provided, however, the inflation affects the loan at the time a loan is made just as much as it*

affects the repayment at the time the repayment is made. But the loan and the repayment do not occur at the same time; there is an interval of time between them, and it may be that the degree of inflation is greater or less at the end than at the beginning of this period, and in this case the change in the inflation may affect the rate of interest *during the process of change.* While it is true, as we have just emphasized, that *after inflation has taken place* no effect is produced on the rate of interest, nevertheless, *while inflation is taking place* there is an effect on the rate of interest because the effect of inflation on the sum loaned is different from the effect on the sum repaid.

Here, again, we encounter one of those *transitional* effects already referred to when we were discussing money and prices. Suppose, for instance, that prices are rising at the rate of 1 per cent per annum. Then, $100 lent to-day is equivalent in purchasing power not to $100 repayable next year, but to $101 repayable next year. If prices hadn't risen, the borrower would have had to pay back as his principal $100, and this would have meant the same amount of goods as were represented by the $100 when he borrowed it. In terms of goods he would have been in the same position at the end as at the beginning, and so would the lender. But we are supposing that prices are rising. Then the lender, if he gets back as his principal only $100, does not get back as much purchasing power as he lent, and the borrower does not pay back as much purchasing power as he borrowed. In other words, the fact that prices have risen during the year has made it easy for the borrower and made it hard for the lender. During the Civil War the United States government issued a great many "greenbacks." The result was an inflation of the currency and a consequent rise of prices, and the result of that was that men who had mortgaged their farms in the West were paying back their loans, and found it very easy. As they said, the mortgages on their farms "disappeared like smoke." If they had

borrowed in 1860, say $5000, the $5000 they paid back in 1864 really only represented half as much purchasing power over goods, for prices had doubled; the inflation of the currency freed them from half their debts. We see, then, that when prices are rising, the principal of a debt becomes less and less valuable. If prices are rising 1 per cent, then the principal of the debt ought to be increased about 1 per cent in order that there should be exactly the same burden on the borrower in paying back as there would have been if prices had not risen. In order to compensate for this rise of prices, if prices are rising at 1 per cent per annum, the borrower ought to pay an extra dollar on each $100 borrowed; so that, if the rate of interest were 5 per cent when prices were low, and will be 5 per cent after prices are high, it ought to be about 6 per cent while prices are rising 1 per cent per year. In that case, a man who has borrowed $100 pays back $106, of which $101 is the equivalent of the principal he borrowed. He calls the whole $6 interest, so that the rate of interest expressed in money would be 6 per cent, in order to be equivalent to 5 per cent when prices are stationary. The rise of interest is a sort of compensation for the falling value of the principal; the interest is increased in order to offset the depreciation in the principal. If prices are rising 2 per cent per annum, we need to add 2 per cent to the rate of interest, and so on. On the other hand, if prices are falling, we must reduce the rate of interest to offset the appreciation of the principal. If prices are falling 1 per cent per annum, the equivalent of a 5 per cent rate of interest during stationary prices would be about 4 per cent.

This ideal compensation in the rate of interest would occur if man's foresight were perfect. If we knew absolutely, for instance, that next year's prices were going to be 2 per cent higher than this year, the rate of interest would be 2 per cent greater than otherwise. So, also, if we knew absolutely that all prices would be 1 per cent less a

year from to-day than to-day, the rate of interest during the year would be, on that account, 1 per cent less than otherwise. But we never know the future exactly; we can only guess. Consequently lenders and borrowers do not make perfect compensation. The facts show that the general sentiment is that prices probably will neither rise nor fall. People are apparently reluctant to believe that prices are going to change very much in either direction. The result of this *inadequacy* of foresight is that, when prices are rising, the rate of interest is usually high, but not so high as it should be to make a perfect compensation for the rise; and that, on the other hand, when prices are falling, the rate of interest is usually low, but not as low as it should be to make a perfect compensation for the fall.

A study of the periods of rising and falling prices in the United States, England, Germany, France, China, Japan, and India verifies these principles. It shows that, in general, when prices are rising, the rate of interest is high, and when prices are falling, it is low.

§ 4. Effect of Unequal Foresight

Another peculiarity of transition periods must be mentioned. This peculiarity grows out of the fact that different persons differ greatly in their power to foresee. In general, borrowers foresee better than lenders. The great borrowers of to-day are not the ignorant poor, but the alert and well-informed rich. It is the function of these people to look ahead, and the consequence is that they foresee a rise or fall of prices more quickly than the lender or bondholder, who are only silent partners in business. Now, a consequence of the superiority in foresight, of borrowers over lenders, is that the borrowers are willing to pay a higher rate than they have to pay, whereas the lenders do not see any reason for raising the rate of interest. Suppose that the rate of interest, on a basis of stationary prices,

is 5 per cent, and that prices are rising 2 per cent per annum. We know that the rate of interest ought to be 7 per cent in order to make things even; but let us suppose that the borrowers foresee that prices are going to rise 2 per cent per annum, and they are perfectly willing to pay 7 per cent, where otherwise they would pay 5 per cent. But the lenders are not alert enough to see why interest should be more than 5 per cent. The consequence will be that the rate of interest will not rise as high as 7 per cent but will be something like 6 per cent. The consequence of this in turn is that the borrowers, who are willing to pay 7 per cent to get the same loans that they used to get at 5 per cent, when they find that they do not have to pay 7 per cent, but can get loans at 6 per cent, will increase the size of their loans. Thus borrowers are encouraged to borrow more. Likewise lenders are encouraged to lend more, for they find that they can get 6 per cent when they are willing to take 5 per cent. This 6 per cent is low in the eyes of the borrowers, but high in the eyes of the lenders. The consequence, therefore, is an inflation of loans stimulated from both sides of the market.

In a previous chapter we saw that an increase of loans of banks makes an increase of deposits, inflates the currency, and makes prices rise further, and so on around the circle of inflation, loans, deposits, and inflation again. The circular process has to come to a stop sometime, but it never does come to a stop until the rate of interest is adjusted. As long as the rate of interest still stays too low, borrowing will continue. Presently people wake up to the danger of this condition of inflated loans and deposits, the rate of interest does go up, discouraging loans and precipitating a crisis. Then we have the back-flow: prices decreasing, interest falling, and a discouragement of business. This has all been explained in a previous chapter. What needs emphasis here is that the essential difficulty in all these changes is with the rate of interest. The rate of interest is the key

to the situation. Were the rate of interest properly adjusted, there would be less trouble, if, indeed, there would be any at all. Crises would be fewer and they would be less severe.

How, then, can we get a better adjustment of the rate of interest? One way is to prevent these changes in price levels as much as possible. This we have already discussed. Another is to have men more alive to the future and more quick to predict what is going to happen to prices. Education on this line will go on and is going on through the trade journals. Still another way is through the removal of the existing prejudice against raising the rate of interest. We still inherit the old idea that interest is "usury" or robbery. If we could once get rid of the prejudice against allowing the rate of interest to rise high as well as to fall low, that is, could regard the rate of interest as properly subject to fluctuation and as being a market price changing day by day, like any other price, a long step would be taken toward preventing crises.

CHAPTER XX

IMPATIENCE FOR INCOME THE BASIS OF INTEREST

§ 1. The Productivity Theory

In the preceding chapter we have considered the relation of money to the rate of interest. We saw that the money supply has no effect on the rate of interest except during transition periods. The real riddle of interest, therefore, still remains unsolved. Why is there such a thing as a rate of interest, even when the purchasing power of money is constant, and what, then, determines that rate? What other factors besides inflation or contraction of the currency affect the rate of interest? We must now go back of money and study the supply and demand of loans.

In our study of prices we began by considering first the part played by money, and then undertook an analysis of supply and demand of goods. We are following the same order in our study of that peculiar price called the rate of interest. We have thus far considered only the part played by money, and now are ready to undertake an analysis of the supply and demand of loans. We shall find that, contrasted with the supply and demand of goods, which resolves itself in the last analysis into a comparison between different marginal desirabilities and undesirabilities, *which are simultaneous*, the supply and demand of loans resolves itself in the last analysis into a comparison between different marginal desirabilities and undesirabilities, *which are not simultaneous*, but are distributed at different points in time.

Before, however, we can fully justify these propositions, we shall need to clear the way by removing some of the many fallacies and pitfalls which surround the subject.

There is, perhaps, no other "nut" so hard to "crack" in all economics as this one of the rate of interest. Before most persons have grown old enough to consider the subject philosophically, they have absorbed, more or less unconsciously, a number of untenable and conflicting theories.

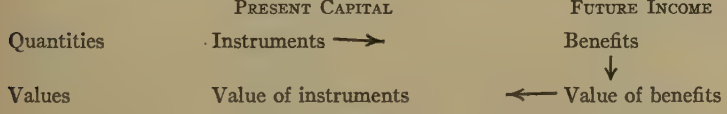
Next to the money fallacies which were considered in the last chapter, one of the most persistent fallacies is that "interest is due to the productivity of capital." If a man who has never thought on the subject is asked why the rate of interest is 5 per cent, he will almost invariably answer, "Because 5 per cent is what investments pay." If you have $100 and invest it, and it yields you 5 per cent a year, the rate of interest is 5 per cent. A $100,000 mill will produce a net income of $5000 a year. A $100,000 piece of land will produce a net crop worth $5000 a year, and so on throughout the whole series of investments. When the rate of interest is 5 per cent, nothing at first sight seems more obvious than that it is 5 per cent because capital yields 5 per cent. Since capital is productive, it seems self-evident that an investment of $100 in productive land, machinery, or any other form of capital, will receive a rate of interest proportionate to its productivity. The proposition looks attractive, but it is superficial. Why is the land worth $100,000? Simply because this is the discounted value of the expected $5000 a year. We have seen in previous chapters that the value of capital is derived from the value of its income, not the value of the income from that of the capital. But whenever we discount income, we have to assume a rate of interest. One hundred thousand dollars is a capitalization calculated on the basis of 5 per cent interest. If we capitalize $5000 at 5 per cent, and get $100,000, we naturally find that we are getting 5 per cent on the investment. We assumed 5 per cent in the first place. We get out exactly what we put in; but if we are not careful, we delude ourselves into thinking that we are getting something we didn't

put in, and thus imagine that the productivity of wealth explains the rate of interest.

It is evident that if an orchard of ten acres yields 100 barrels of apples a year, the physical-productivity, 10 barrels per acre, does not of itself give any clew to what rate of return on its value the orchard yields.

The orchard produces the apples, but the *value* of the orchard does not produce the *value* of the apples; on the contrary, the value of the *apples* produces the value of the *orchard*.

The following diagram shows the typical relation between capital and the productivity of capital in the physical sense and also in the sense of value return, — which latter is the important factor in studying the rate of interest.



This scheme signifies that (1) any instrument, such, for instance, as land, railways, factories, dwellings, or food, is the means for obtaining benefits of any kind. This first step in the sequence pertains to the study of the "technique" of production, and involves no rate of interest. (2) The benefits are valued in money. This step pertains to the study of prices. (3) From the value of the benefits thus obtained is computed the value of the original instrument *by the process of discounting*. This final process introduces the element of interest. It is clearly with this last process that we are concerned in the study of interest.

The paradox that, when we come to the *value* of capital, it is income which produces capital, and not the reverse, is, then, the stumbling block of the productivity theorists. It is clear, of course, in any particular investment, that the selling value of the stock or bond is dependent on its expected income. And yet business men, although constantly

employing this discount process in specific cases, usually cherish the illusion that they do so because their capital-value in some vague " other use " actually produces interest. They fail to observe that the principle of discounting the future is universal, and applies to any investment whatsoever, and that in such a discount-process there is necessarily assumed the very rate of interest we are seeking to explain. It is futile to derive the rate of interest from the productivity of capital.

The futility of this productivity theory may be further illustrated by observing the effect of a *change* of productivity. If productivity makes interest, then a change in productivity ought to make a change in interest. Yet, if an orchard could in some way he made to yield double its original crop, though the productivity of that capital in the physical sense would be doubled, in the sense of the rate of interest its yield would not be necessarily affected at all, — certainly not doubled. For the orchard whose yield of apples should increase from $1000 worth to $2000 worth would itself correspondingly increase in value. For some reason or other people would find themselves calling it a $40,000 orchard instead of a $20,000 orchard; and the ratio of the income to the capital-value would then remain as before, namely, 5 per cent. To raise the rate of interest by raising the productivity of capital is, therefore, like trying to raise one's self by one's boot straps.

Nor can this conclusion be escaped (as has sometimes been attempted) by supposing the increasing productivity to be universal. It has been asserted, in substance, that though an increase in the productivity of one orchard would not appreciably affect the total productivity of capital, and hence would not appreciably affect the rate of interest, yet if the productivity of all the capital of the world could be doubled, the rate of interest would be doubled. Now, doubling the productivity of the world's capital would not be entirely without effect upon the rate of interest; but the

effect would not be in the simple direct ratio supposed. Indeed, an increase of the productivity of capital would probably result in a decrease, instead of an increase, of the rate of interest. To double the productivity of capital might more than double the value of the capital; at least that it would fail to do so has not been shown by the productivity theorists, much less that capital would remain unchanged in value. And if it doubled in value, we should have the same result as before.

§ 2. The Socialist's Theory

So much for the productivity theory. We have next the socialist's theory. The socialist has the idea that interest is robbery. He says " it is all wrong that the capitalist who does not lift a finger should get any pay; he is getting something for nothing, and that is interest; interest is robbery; interest is sucking the blood out of somebody else, viz. the workman." According to the socialist theory, especially as represented by Karl Marx, interest is exploitation; it is payment which, for some reason never satisfactorily explained, is made to the rich who sit by and do nothing, while somebody else produces all the tribute that has to be poured into their laps. The socialists say that labor produces capital and therefore produces the interest from capital, and therefore labor should get all the income from capital; and since the laborer does not get it all, it must be held back by somebody who is in a position of vantage to steal it. This is the key of so-called " scientific socialism." There are many motives for socialism, but so far as it has an economic theory behind it, this is it. The capitalist, these socialists believe, holds a club over the workman and virtually says, " If you will come to-day and work for me, I will give you half of what you produce; I have got the capital, and you can't get on without me, and therefore I am in a posit on to rob you."

The socialist's position involves two propositions: first, that all income and all capital are practically produced by labor; and secondly, that all the income should be paid to the laborer. Now the first proposition is much more nearly correct than the second. We need not contest it in order to see the fundamental error in socialism. Let it be granted that practically every instrument of production is produced by labor; let it be granted that the capitalist is always living on the product of past labor; that a millionaire who gets his income from railroads, ships, and houses, all products of labor, is reaping what labor sowed; that the capitalists of to-day are receiving compound interest on the labor of the past.

It does not follow that injustice has been done to the laborer. Let us consider the case of a tree planted with $1 worth of labor, and 25 years later worth $3. The socialist virtually asks, "Why should not the laborer who planted the tree receive $3 instead of $1 for his work?" The answer is that he may receive it, provided he will wait 25 years for it! As Böhm-Bawerk says:—

"The perfectly just proposition that the laborer should receive the entire value of his product may be understood to mean either that the laborer should *now* receive the entire *present* value of his product, or should receive the entire future value of his product *in the future*. But Rodbertus and the socialists expound it as if it meant that the laborer should *now* receive the entire *future* value of his product."

It would be a mistake to say that there is no exploitation of laboring men by capitalists, because we know the contrary to be the fact, but it is absurd to condemn all interest on the ground of exploitation. The basis of interest is much deeper. It lies in the preference for present over future goods. It is because the laboring man can't wait that he is willing to take something less than the whole value, and it is right that he should do so, because the capitalist does not like to wait either, and the capitalist is really doing

a favor to the laborer when he pays him in advance for planting a tree and waits himself 25 years before getting the product.

§ 3. Impatience the Source of Interest

The essence of interest is impatience, the desire to obtain gratifications earlier than we can get them, the preference for present over future goods. This preference comes from a fundamental attribute of human nature. As long as people like to have things to-day rather than to-morrow, there will be a rate of interest.

Interest is, as it were, impatience crystallized into a market rate. The rate of interest is formed out of the various degrees or rates of impatience in the minds of different people. The rate of impatience in any individual's mind is his preference for an additional dollar, or one dollar's worth of goods, available to-day, over an additional dollar, or dollar's worth of goods, available a year from to-day. In other words, it is the excess of the marginal desirability of to-day's money over the marginal desirability of next year's money viewed from to-day's standpoint. It can be expressed in numbers as the premium that a man is willing to pay for this year's over next year's money. If, for instance, in order to get $1 to-day he is willing to pay $1.05 next year, then his rate of impatience is 5 per cent. The present $1 is worth to him so much that in order to get it he is willing to pay more than $1 in the future for it; it is because of the willingness to do this that there is such a thing as the rate of interest. A man will prefer to have a machine to-day rather than a machine in the future; a house to-day rather than a house a year from now; a piece of land to-day rather than a piece of land when he is ten years older; he would rather have some food to-day than wait until next year for it, or a suit of clothes or stocks or bonds, or anything else.

But what are these present and future "goods" which are thus contrasted? At first sight it might seem that the

"goods" compared may be indiscriminately wealth, property, or benefits. It is true that present machines are preferred to future machines; present houses to future houses; land possessed to-day to land available next year; present food or clothing to future food or clothing; present stocks or bonds to future stocks or bonds; present music to future music, and so on. These seem a very heterogeneous compound by which to explain so homogeneous a thing as interest. But a slight examination will show that some of these cases of preference are reducible to others. When present capital (whether capital-wealth or capital-property) is preferred to future capital, this preference is really a preference for the *income* of the first capital as compared with the *income* of the second. The reason we would choose a present fruit tree rather than a similar fruit tree available in ten years is that the fruit production of the first will occur earlier than that of the second. The reason one prefers immediate tenancy of a house to the right to occupy it in six months is that the uses of the house will begin six months earlier in one case than in the other. In short, capital-wealth available early is preferred to capital-wealth of like kind available at a more remote time, simply because the *income* of the former is available earlier than the *income* of the latter. For the same reason, early capital-property is preferred to late capital-property of a similar kind. For property is merely a claim to future income; and the earlier the property is acquired, the earlier will the income accrue, the right to which constitutes the property in question.

Thus, all rates of impatience resolve themselves into preference for early *income* over late *income*. Moreover, the preference for present income over future income resolves itself into the preference for present *final* income over future *final* income. The income from an article of capital which consists merely of an "interaction" is desired for the sake of the final income to which that interaction paves the way. We prefer present bread baking to future bread

baking because the enjoyment of the resulting bread is available earlier in the one case than in the other, Present weaving is preferred to future weaving, because the earlier the weaving takes place, the sooner will the cloth be manufactured, and the sooner will the clothing made from it be worn by the consumer.

When, as is usually the case, exchange intervenes between the weaving and the use of the clothes, the goal in the process is somewhat obscured by the fact that the manufacturer regards his preference for present weaving over future weaving as due not to the fact that the clothes will be more early available to those who will wear them, but to the fact that *he* will be enabled to obtain a quicker income by selling the cloth earlier. To him early sales are more advantageous than deferred sales, because the earlier the money is received, the earlier can he spend it for his own personal uses, — the shelter and the comforts of various kinds constituting his real income. It is not he, but his customers, those who buy the cloth he manufactures, that base their preference for present cloth over future cloth on the earlier availability of the *clothes* which can be made from it. But in both cases the mind's eye is fixed on some ultimate enjoyable income to which the interaction in question is a mere preparatory step. We thus see that all preference for present over future goods resolves itself, in the last analysis, into a *preference for early enjoyable income over late enjoyable income*. Every preference for present over future goods reduces itself, therefore, to this preference for present satisfactions over future satisfactions.

The preference for present over future goods, when thus reduced to its lowest terms, rids the values of the contrasted present and future goods of the interest element, which, in all other attempts at explanation, is so unconsciously presupposed. When any other goods than enjoyable income are considered, their values already imply a rate of interest. When we say that interest is the premium on the value of

a present house over that of a future house, we are apt to forget that the value of each house is itself based on a rate of interest. For, as we have seen, the price of a house is the discounted value of its future income, and in the process of discounting there always lurks a rate of interest. The value of houses will rise or fall as the rate of interest falls or rises. Hence, when we compare the values of present and future houses, both terms of the comparison involve the rate of interest. If, therefore, we undertake to make the rate of interest depend on the relative preference for present over future houses, we are making it depend on two elements, in each of which it already enters — present houses and future houses. The same is true of all capital, and also of those items of income which we have called interactions; for the value of an interaction is the discounted value of the ultimate income to which that interaction leads. We could not rest satisfied in the statement that interest is the premium on the value of present tree planting over that of future tree planting; for the value of each tree planting itself depends on the rate at which the future income from the tree is discounted. But when present *ultimate* income is compared with future *ultimate* income, the case is different, for the value of ultimate income involves no interest whatever. We see, therefore, that the reduction of the problem of interest to a comparative value of present and future enjoyable income avoids the difficulty of making interest depend on magnitudes which themselves depend in turn on interest.

CHAPTER XXI

INFLUENCES ON IMPATIENCE FOR INCOME

§ 1. Influence which Time-shape of Income exerts on the Rate of Impatience

But we have not yet wholly solved the problem of interest. It is not enough to know that the more impatient a people are, the higher will their rate of interest be, and that the more patient they are, the lower their rate of interest. We must also know on what causes the rate of impatience depends. It depends principally upon the character of one's enjoyable income. Smith's rate of preference for present over future satisfactions will depend on the abundance of his present over his future satisfactions. If the future satisfactions that he expects and looks forward to are very great, and his present satisfactions are very small, he will be impatient to leave his present scarcity and arrive at the expected future abundance; that is, he have a high rate of preference for present over future satisfactions. This is on the same principle that prices are high when goods are scarce. The preference for present satisfactions is high if present satisfactions are scarce. Now the rate of preference which Smith has for present satisfactions over future satisfactions will depend on his whole future stream of satisfactions, that is, what we call his final enjoyable income. It will depend on *four* characteristics of that income: first, as just said, it will depend on the *time-shape* of the income, — the relative abundance of his present and his future satisfactions; second, on the *amount* of the income, *i.e.* whether his satisfactions are few or many; third, on the *composition* or make-up of the income, *i.e.* in what proportions it consists of the

gratifications of the palate, of vanity, clothing, shelter, and the other elements which make up income; and fourth, on the *uncertainties* of the income, *i.e.* to what extent his satisfactions throughout future years can be depended upon.

The rate of impatience of any individual depends, then, on the character of his *income*, *i.e.* on four characteristics of income: —

its time-shape
its amount
its composition
its uncertainties

This proposition — that the preference of any individual for present over future income depends upon the nature of his prospective enjoyable income — corresponds to the proposition in the theory of prices, that the marginal desirability of any article depends upon the quantity of that article; both propositions are fundamental in their respective spheres.

Fig. 39.

We have first to consider the influence upon the rate of impatience, of time-shape of income, *i.e.* the distribution of income in time. Four different types of time-shape may be distinguished: *uniform* income, consisting of equal yearly items, as represented in Figure 39; *increasing* income, as represented in Figure 40; and *decreasing* income, as repre-

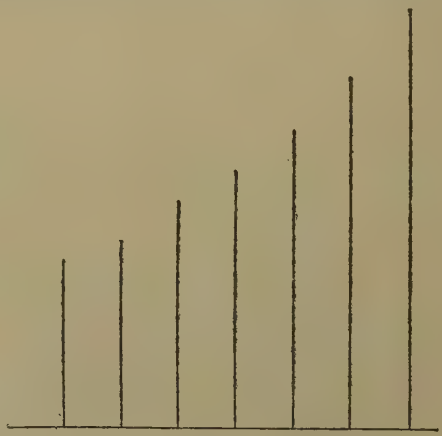


Fig. 40.

sented in Figure 41. The effect of possessing an increasing income (Fig. 40) is, as we have just seen, to make the possessor impatient, *i.e.* to make his preference for present over future income higher than otherwise; for it means that the earlier income is relatively scarce, and the remoter income, relatively abundant. A man who is now enjoying an income of only $1000 a year, but expects in ten years to be enjoying one of $10,000 a year, will prize a dollar to-day far more than a dollar due ten years hence. He has "great expectations." He values the present's scarce dollars or dollars' worth of satisfaction more highly than the future's abundant dollars or dollars' worth of satisfaction. He may, to satisfy his impatience, borrow money to eke out this year's income, and make repayment by sacrificing from his more abundant income ten years later.

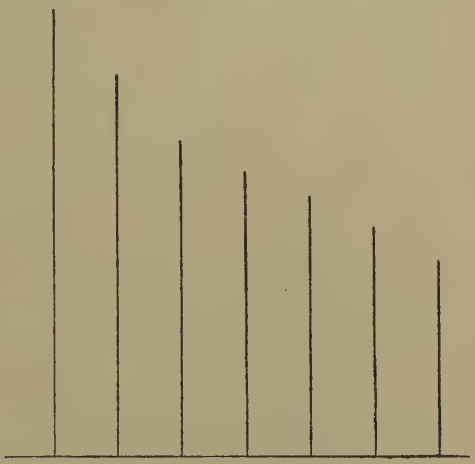


FIG. 41.

Reversely, a gradually decreasing income (Fig. 41), making, as it does, the earlier income relatively abundant, and the remoter income relatively scarce, tends to reduce impatience, or the preference for present as compared with future income. The man with a descending income says, "I have all the money I want to-day, and more perhaps, but next year I shan't have as much as I want." He will therefore strive to save from his present abundance to provide for coming needs.

The extent of these effects will, of course, vary greatly with different individuals. Corresponding to a given ascending income, one individual may have a rate of impatience of 10 per cent and another only 4 per cent. What we need here to emphasize is merely that, in the case of both of these individuals, a descending income causes a lower rate of impatience than an ascending income.

§ 2. Influence of Size and Composition of Income

So much for the time-shape of a man's income, or its distribution in time. Our next topic is the dependence of impatience on the *size* of income. In general, it may be said that the smaller the income a man has, the higher is his preference for present over future income. It is true that a small income implies a keen appreciation of future wants as well as of immediate wants. Poverty bears down heavily on all parts of a man's life, both that which is immediate and that which is remote. But it enhances the utility of immediate income *even more* than of future income.

This result is partly rational, because of the importance of supplying present needs, in order to keep up the continuity of life and the ability to cope with the future; and partly irrational, because the pressure of present needs blinds one to the needs of the future.

As to the rational side, it is clear that present income is absolutely indispensable, not only for the present, but even as a precondition to the attainment of future income. One break in the thread of life is sufficient to destroy all future enjoyment. It is of the utmost importance, therefore, to keep up life. As the phrase is, "a man must live," and the present is the time to keep to life in order to have any life in the future. If, then, a man were on a desert island and had only such rations as would last a few months, he would naturally prefer to use them immediately — sparingly, but immediately — rather than to put off their consumption

ten years, because if he put off consuming them, he couldn't consume them at all; he would die in the meantime. And in general, a man who is poor, and upon whom poverty presses so as to make it hard to make both ends meet, will always have a higher realization and appreciation of the future than a man who is rich.

As to the irrational side, the poorer a man, the more his eyes are blinded to future needs. He is too much occupied with the need of the present, and shuts his eyes to the future. To him " sufficient unto the day is the evil thereof." We all suffer from lack of perspective, and tend to exaggerate the needs of the present. But poverty especially tends to distort the perspective. Its effect is to relax foresight and self-control, and tempt one to " trust to luck " for the future, if only the all-absorbing clamor of present necessities may thus be satisfied.

We see, then, that a low income tends to produce a high degree of impatience, partly from lack of foresight and self-control, and partly from the thought that provision for the present is necessary both for itself and for the future as well.

We come next to the influence of the *composition* of the income-stream on the rate of impatience of its possessor. An income worth $5000 may, for one individual, comprise one set of enjoyable services, and for another, an entirely different set. The inhabitants of one country may have relatively more house shelter and less food element in their incomes than those of another. These differences will have an influence in one direction or the other upon the rate of impatience. Diminution of any one constituent of income would have an effect upon rate of impatience similar to the effect of diminution of income in general. A decrease of the food element would be felt especially, both because this element usually forms a considerable part of income and because it is a prime necessity.

§ 3. Influence of Uncertainties of Income

The next influence on the rate of impatience and therefore on the rate of interest is risk or uncertainty. Now uncertainties affect the impatience in several different ways. In general, risks tend to raise the degree of impatience. There are four ways in which risk tends to raise, and one in which it tends to lower, impatience.

First, and most familiar, we know that if a loan is risky, the rate of interest has to be high. If the repayment of a loan is regarded as uncertain, that fact will have to be offset by an increase in the rate of interest, and produces a corresponding rate of impatience for risky loans.

But even the rate of interest in riskless loans will be raised by risk in certain ways now to be discussed. The second way in which risk tends to raise the rate of impatience is in the risk of life. It acts like the risk of a loan. You may tell a man he is perfectly sure of being repaid his loan fifty years from now. Nevertheless, that will not cause him to regard the money which will come fifty years hence as equal in value to the money which he has in his pocket to-day, because he runs the risk of dying inside of fifty years; it is cold comfort to tell him he is sure to get his money after he is dead! A sailor is a type of man who is constantly taking this fact into account. He knows that almost any day he may be shipwrecked, and the consequence is he prefers money in his pocket to-day to money next year. Sailors are proverbial spendthrifts and have a proverbially high degree of impatience.

The third way in which risk tends to increase impatience is seen where present income is risky as compared with future income. A man in time of war, when there is prospect of peace in the future, looking forward to a relatively safe income in the future, will have a high degree of impatience for that future to arrive, because the present risky income is in his eyes not equivalent to the future safe income.

Fourthly, the risk of income may, instead of applying especially to remote periods or especially to immediate periods, apply to all alike. Such a condition largely explains why salaries and wages are lower than the average earnings of those who work for themselves. Those who choose salaries rather than profits are willing to accept a low income in order to get rid of a precarious one. Since a risky income, if the risk applies evenly to all parts of the income-stream, is nearly equivalent to a low income, and since a low income, as we have seen, tends to intensify impatience, risk, if uniformly distributed in time, must tend to increase impatience.

These, then, are the four ways in which risk tends to increase impatience. There is, however, one way in which risk tends to *decrease* impatience. The instance just given is where immediately future income is risky, but income thereafter safe. That sometimes happens, as just indicated, where in time of war man expects peace in the future, or in time of scikness he expects to get well and resume his regular earning power. Nevertheless, there are numerous examples of the opposite type, where the risk applies to the future and not to the present. If a ship owner, for instance, has his ship in port to-day, but is going to sail within a few months, his risks are high in the future as compared with the present. His future looks dubious, and that will cause him to be less impatient, because a risky future income is equivalent to a small future income, and we have seen that a small future income tends to lessen impatience. An income which gets more and more risky in the future is therefore like an income which gets more and more small in the future. In actual fact such a type is not uncommon. The remote future is usually less known than the immediate future. This means that the risk connected with distant income is greater than that connected with income near at hand. The chance of disease, accident, disability, or death is always to be reckoned with, but under ordinary circumstances is greater in the remote

future than in the immediate future. Consequently there is usually a tendency, so far as this influence goes, toward a low rate of impatience. This tendency is expressed in the phrase to "lay up for a rainy day."

Risk, then, operates in diverse ways according to diverse circumstances. We see that risk tends in some cases to increase and in others to decrease the rate of impatience. There is a common principle, however, in all these cases. Whether the result is a high or a low rate of impatience, the primary fact is that the risk of losing the income in a particular period of time operates as a virtual impoverishment of the income in that period, and hence increases the estimation in which it is held. If that period is a remote one, the risk to which it is subject makes for a high appreciation of remote income; if the period is the immediate future, the risk makes for a high appreciation of immediate income; if the risk is in all periods of time, it acts as a virtual decrease of income all along the line.

The rate of impatience depends, then, upon the time-shape of an income-stream, its size, its composition, and its uncertainties.

§ 4. Influence of Differences in Human Nature

It is clear that the rate of impatience which corresponds to a specific income-stream will not be the same for everybody. One man may have a rate of impatience of 5 per cent and another a rate of impatience of 10 per cent, although both have the same income. The difference will be due to the personal characteristics of the individuals. These characteristics are chiefly five in number: (1) foresight, (2) self-control, (3) habit, (4) expectation of life, (5) love for posterity. We shall take these up in order.

(1) First, as to foresight. Generally speaking, the greater the foresight, the less the rate of impatience, and *vice versa*. In the case of primitive races and uninstructed

classes of society, the future is seldom considered in its true proportions. The story is told of a Southern negro that he would not mend his leaky roof when it was raining, for fear of getting more wet, nor when it was not raining, because he did not then need shelter. Among such persons the rate of impatience for present gratification is powerful because their comprehension of the future is weak. If we compare the Scotch and the Irish, we will find a contrast in this respect. The Irish, in general, lack foresight and are improvident, and the Scotch have foresight and are provident. Consequently the rate of interest is high in Ireland and low in Scotland.

These differences in degrees of foresight produce corresponding differences in the dependence of impatience on the character of income. Thus, for a given income, say $1000 a year, the reckless might have a rate of impatience of 10 per cent, when the forehanded would experience a rate of only 5 per cent. In both cases the rate of impatience will depend on the size of the income. The lower the income, the higher the rate of impatience will be. But the particular rates corresponding to a particular income in the two cases will be entirely different. Therefore the rate of impatience, in general, will be higher in a community consisting of reckless individuals than in one consisting of the opposite type.

(2) We come next to self-control. This trait, though distinct from foresight, is usually associated with it and has very similar effects. Foresight has to do with *thinking*, self-control with *willing*. A weak will usually goes with a weak intellect, though not necessarily, and not always. The effect of a weak will is similar to the effect of inferior foresight. Like those workingmen who cannot carry their pay home Saturday night, but spend it on the way in a grogshop, many persons cannot deny themselves any present indulgence, even when they know definitely what the consequences will be in the fuutre. Others, on the con-

trary, have no difficulty in stinting themselves in the face of all temptations.

(3) The third characteristic of human nature which needs to be considered is habit. That to which one is accustomed exerts necessarily a powerful influence upon his valuations and therefore upon his rate of impatience. This influence may be in either direction. A rich man's son who has been brought up in habits of self-indulgence, when he finds himself with a smaller income than his father provided him during his formative years, will have a higher rate of impatience than a man who has the same income but who has climbed up instead of climbed down.

(4) The expectation of life will affect a man's rate of impatience. We have already seen this in another connection. A man who looks forward to a long life will have a relatively high appreciation of the future, which means a relatively low appreciation of the present; whereas a man who has a short life to look forward to will want it at least to be a merry one. "Eat, drink, and be merry, for to-morrow we die" is the motto applying to this type.

If we will take the history of a man's life, we shall find that he changes his rate of impatience at successive periods. A child will have a high rate of impatience because of his lack of foresight and self-control. When he reaches the age of young manhood, he may still have a high rate of impatience, but for a different reason, viz. because he then expects a large future income. He expects to get on in the world, and he will have a high rate of impatience because of the relative abundance of the imagined future as compared with the realized present. When he gets a little farther along, and has a family, the result will be a low rate of impatience, because then the needs of the future rather than the endowment of the future will appeal to him. He will not think that he is going to be so very rich in the future; on the contrary, he will wonder how he is going to get along in the future because he will have so many mouths to feed.

He looks forward to the future expenses of his wife and children with the idea of providing for them — an idea which makes for a high relative regard for the future and a low relative regard for the present. Then when he gets a little older, and his children are married and gone out into the world and are taking care of themselves, he again has a high rate of impatience, because he expects to die, and he thinks, " Why shouldn't I enjoy myself during the few years that remain, instead of piling up for the remote future? "

So there are four periods in the cycle of a man's life: (1) childhood ; (2) young manhood ; (3) the time when he has a wife and family to look out for and provide for in the future ; (4) and lastly, the time of his life when he again looks out only for himself and expects to die presently. These, for different reasons, affect in different ways a man's rate of impatience.

(5) The fifth circumstance is a love for posterity. Probably the most powerful cause tending to reduce the rate of interest is love for one's children and the desire to provide for their good. When these sentiments decay, as they did at the time of the decline and fall of the Roman Empire, and it becomes the fashion to exhaust wealth in self-indulgence and leave little or nothing to offspring, the rate of impatience and the rate of interest will be high. At such times the motto, " After us the deluge," indicates the feverish desire to squander in the present, at whatever cost to the future. A noted gambler, who had led a wild and selfish life, once said, when life insurance was first explained to him, " I have seen many schemes for making money, but this is the first time I have seen a scheme where you had to die before you could rake in the pile." That man didn't care for a payment which would come in after his death. But there are many men who do, and in fact care much more for it than for anything else in the world. This care leads them to insure their lives in order that they may leave the money to their families. Their desire to provide for those who

survive them gives them a low rate of impatience. Life insurance, by training people to look out for posterity, is acting as one of the most powerful means of lowering the rate of impatience and therefore the rate of interest. At present in the United States the insurance on lives amounts to $20,000,000,000. This represents, for the most part, an investment of the present generation for the next. The investment of this sum springs out of a low rate of impatience, and tends to produce a low rate of interest.

Thus we see that men may differ in many ways which affect the rate of interest and rate of impatience. We may contrast two extreme types of men. Men may have a high rate under the following conditions: if (irrespective of the character of their income) they are shortsighted, or are weak-willed, or have habits of a spendthrift, or look forward to a short or uncertain life, or are selfish, and have no regard for posterity. The opposite characteristics will lead to a low rate of impatience: foresight, self-control, habits of thrift, length and certainty of life, and altruism with respect to posterity.

Then we see that a man's rate of impatience depends (1) upon his income and (2) upon his nature. In the table on page 339 we can contrast the extreme types of income and the extreme types of human nature, and see how the rate of impatience will depend upon the various combinations involved.

By comparing the types of income and human nature we find nine compartments in the table. If we compare the figures in the same vertical column, we see that they grow less as we descend, expressing the influence of the character of income. If we compare the figures in the same horizontal line, we see that they grow less toward the right, expressing the influence of human nature. But a man may have an income-stream of a kind which tends to make a high rate of impatience, and at the same time a nature of a kind which tends to make a low rate of impatience. The

result will then be a compromise rate of impatience, say 5 per cent. Or a man may have an income-stream which tends to make his rate of impatience low, and a nature which tends to make the rate of impatience high. Thus 5 per cent is found three times in the table forming a diagonal. The other diagonal shows the contrast between the extreme where both the character of the income and of the nature of the individual conspire to make a very high rate of impatience and the opposite extreme where they conspire to make a very low rate of impatience.

Description of Income				Corresponding Rate of Impatience to an Individual who is		
Size	Time-shape	Composition	Uncertainties	Short-sighted, weak-willed, accustomed to spend, without heirs	Of a mixed or medium type	Far-sighted, self-controlled, accustomed to save, desirous to provide for heirs
Small	Increasing	Food scanty	Precarious	20%	10%	5%
Of a mixed or medium type				10%	5%	2%
Large	Decreasing	Food abundant	Assured	5%	2%	1%

CHAPTER XXII

THE DETERMINATION OF THE RATE OF INTEREST

§ 1. Equalizing Marginal Rates of Impatience

In the last chapter we saw that the rate of preference for present over future goods is, in the last analysis, a preference for present over future income; that this, preference depends, for any given individual, upon the character of his income-stream, — its size, time-shape, composition, and uncertainties, — and that the nature of this dependence varies with different individuals.

The question now arises, Will not the rates of impatience of different individuals be very different, and if so, what relation do these different rates have to the rate of *interest?* It might seem at first that the rates of impatience would differ widely, and that the rate of interest must be some sort of average of their different magnitudes. But this is incorrect. In a nation of hermits, without any mutual lending and borrowing, the rate of impatience of individuals would diverge widely, but there would be no rate of interest. It is modern society's habit of borrowing and lending that tends to bring into equality the rates of impatience in different minds, and it is only because of the limitations of the loan market that absolute equality is not reached.

The chief limitation to lending is due to the risk involved, and to the difficulty or impossibility of obtaining the security necessary to eliminate or reduce that risk. Those who are most willing to borrow are oftentimes those who are least able to give security. It will then happen that these persons, shut off from the loan market, experience a higher rate of impatience than the rate of interest ruling in that

market. If they can contract loans at all, it will be only through the pawnshop or other high-rate agencies.

But for the moment let us assume a perfect market, in which the element of risk is entirely lacking, both with respect to the certainty of the expected income-streams belonging to the different individuals, and with respect to the certainty of repayment for loans. In other words, we assume that all individuals are initially possessed of foreknown income streams, and are free to exchange any part of them so that present income is exchanged for future income. We assume, further, that to buy and sell various parts of one's income-stream (by loans, etc), is the only method of altering that income-stream. Prior to such exchange, the income-stream is supposed to be *rigid*, *i.e.* fixed in size, time-shape, and composition. The capital instruments which the individual possesses are each supposed to be capable of only a single definite series of services contributing to his income-stream.

Under these hypothetical conditions, the rates of impatience for different individuals would be perfectly equalized. Borrowing and lending evidently affect the time-shape of the incomes of borrower and lender; and since the time-shape of their incomes affects their rate of impatience, such a modification of time-shape will react upon and modify their rate of impatience and bring the market into equilibrium.

For if, for any particular individual, the rate of impatience differs from the market rate, he will, if he can, adjust the time-shape of his income-stream so as to harmonize his rate of impatience with the interest rate. For instance, those who, for a given income-stream have a rate of impatience above the market rate, will sell some of their surplus future income to obtain (*i.e.* "borrow") an addition to their present meager income. This will have the effect of enhancing the value of the future income and decreasing that of the present. The process will continue until the

rate of impatience of this individual is equal to the rate of interest. In other words, a person whose impatience rate exceeds the current rate of interest will borrow up to the point which will make the two rates equal. Reversely, those who, with a given income-stream, have a rate of impatience below the market rate, will sell (*i.e.* "lend") some of their abundant present income to eke out the future, the effect being to increase their rate of impatience until it also harmonizes with the rate of interest.

To put the matter in figures, let us suppose the rate of interest is 5 per cent, whereas the rate of impatience of a particular individual is at first 10 per cent. Then, by hypothesis, the individual is *willing* to sacrifice $1.10 of next year's income in exchange for $1 of this year's. But in the market he is *able* to obtain $1 for this year by spending only $1.05 of next year. This ratio is, to him, a cheap price. He therefore borrows, say, $100 for a year, agreeing to return $105; that is, he contracts a loan at 5 per cent when he is willing to pay 10 per cent. This operation, by increasing his present income and decreasing his future, tends to reduce his rate of impatience from 10 per cent to, say, 8 per cent. Under these circumstances he will borrow another $100, being now willing to pay 8 per cent, but having to pay only 5 per cent. This operation will still further reduce his rate of impatience. He will continue to borrow until his rate of impatience has been finally brought down to 5 per cent. Then for the last or "marginal" $100, his rate of impatience will agree with the market rate of interest. As in the general theory of prices, this marginal rate, 5 per cent, being once established, applies indifferently to all his valuations of present and future income. Every comparative estimate of present and future which he actually makes must be "on the margin" of his income-stream as actually determined.

In like manner, if another individual, entering the loan market from the other side, has at first a rate of impatience

of 2 per cent, he will become a lender instead of a borrower. He will be *willing* to accept $102 of next year's income for $100 of this year's income, but in the market he is *able*, instead of the $102, to get $105. As he can lend at 5 per cent when he would gladly do so at 2 per cent, he jumps at the chance and invests, not one $100 only, but another and another. But his present income, being reduced by the process, is now more highly esteemed than before, and his future income, being increased, is less highly esteemed. The result will be a higher relative valuation of the present, which, under the influence of successive additions to the sums lent, will rise gradually to the level of the market rate of interest.

In such an ideal loan market, therefore, where every individual could freely borrow or lend, the rates of impatience for present over future income for all the different individuals would become equal to each other and to the rate of interest.

To illustrate these principles by diagrams, let us suppose a man has a given income-stream, as indicated in Figure 42. It is assumed that his income-stream is an ascending one, as between this year and next year, that is, that this year's income is relatively small and next year's income relatively large. It may be that this year he is ill, and therefore has not earned his usual amount of money, and that next year he expects to get an unusual income from some particular source. This man will then probably be impatient to get the large income he anticipates. He does not wish to wait till next year if he can avoid it. His impatience is due to a scarcity of income this year and an abundance of income next year. He will wish to adjust his income or rectify the disparity by increasing this year's income at the expense of next year's income.

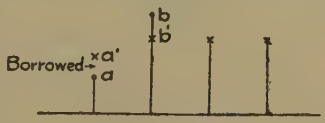


FIG. 42.

He will borrow, but borrowing changes the time-shape of

his income-stream. His *original* income in the first year is indicated by the height *a*, and that next year by the (greater) height *b*. The effect of borrowing will be to elevate the first line to *a′* and to depress the second to *b′*. These two adjustments will lessen both the scarcity of this year's income and the abundance of next. This will therefore modify the time-shape of his income and lessen the valuation he puts on a dollar this year as compared with next. This reduces the premium he puts on this year's dollar, *i.e.* his rate of impatience. By increasing his loan he can evidently reduce this premium to conform to the rate of interest. He can also make other loan contracts or plan to make them later, by which he can increase or decrease any year's income at the expense of an opposite change in some other year or years. In this way he can alter the time-shape of his income-stream at will, and he will always so alter it as to make his rate of impatience equal to the rate of interest. He began with a rate of impatience greater than the market rate of interest, but ended in harmony with that rate.

Figure 43 represents the income-stream of a man supposed to have a rate of impatience at first less than the rate of interest. If we choose, we may suppose that he has just received a small legacy which makes this year's available income unusually large, while he expects next year to have an unusually small income. Looking forward to next year, he sees that it will be hard to get along comfortably, while this year he has more than he needs. He therefore invests some of his present abundance to the extent of *aa′* in order to eke out his future scarcity by *bb′*. He will do so, however, only provided his rate of impatience for present over future goods is less than the market rate of interest, 5 per cent, and he will do so only up to the point which will bring down his rate of impatience to the level of this rate of interest.

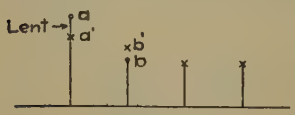


FIG. 43.

The two men started out with rates of impatience different from the market rate of interest. The market rate was 5 per cent, while the first man had a rate of impatience above this, and the second a rate of impatience below this. But when they finished their loan operations or readjustments in the time-shape of their income-streams, they brought their rates of impatience each into harmony with the rate of interest and therefore with each other. Therefore, as long as there is a market in which everybody can borrow or lend at will at 5 per cent, everybody will have at the margin a rate of impatience of 5 per cent. Nobody will have a rate of impatience above 5 per cent, because, if it is at first above it, he will borrow enough to bring it down to the market rate; and nobody will have a rate below it, because if it is at first below it, he will lend enough to bring it up to the rate of interest.

Even men of widely different natures as to foresight, self-control, etc., will have the same marginal rates of impatience. We have seen that different men, even with precisely the same incomes, may have different rates of impatience. But in that case they will not continue to have the same sorts of income.

§ 2. Spending and Investing

It must not be imagined that the classes of borrowers and lenders correspond respectively with the classes of poor and rich. Personal and natural idiosyncrasies, early training, and acquired habits, accustomed style of living, the usages of the country, and other circumstances will, by influencing foresight, self-control, regard for posterity, etc., determine whether a man's rate of impatience is high or low, and whether he becomes a borrower or a lender.

It should be noted that borrowing and lending are not the only ways in which one's income-stream may be modified. The same result may be accomplished simply by buying and selling property; for, since property rights are

merely rights to particular income-streams, their exchange substitutes one such stream for another of equal value but differing in time-shape, composition, or certainty. This method of modifying one's income-stream, which we shall call the method of sale, really includes the former method of loan; for a loan contract is at bottom a sale; that is, it is the exchange of the right to present or immediately ensuing income for the right to more remote or future income. A borrower is a seller of a note of which the lender is the buyer. A bondholder is regarded indifferently as a lender and as a buyer of property.

The concept of a loan may therefore now be dispensed with by being merged in that of sale. By selling some property rights and buying others it is possible to transform one's income-stream at will, whether in time-shape, composition, or probability. Thus, if a man buys an orchard, he is providing himself with future income in the use of apples. If, instead, he buys apples, he is providing himself with similar but more immediate income. If he buys securities, he is providing himself with future money, convertible when received into true or enjoyable income. If his security is a share in a mine, his income-stream is less lasting, though it may be larger, than if the security is stock in a railway.

Purchasing the right to remote enjoyable income is called *investing;* to immediate enjoyable income is called *spending*. The antithesis between "spending" and "investing" is merely the antithesis between immediate and remote income. The adjustment between the two determines the time-shape of one's income-stream. Spending increases immediate income but robs the future, whereas investing provides for the future to the detriment of the present.

From what has been said it is clear that by buying and selling property an individual may change the conformation of his income-stream precisely as though he were specifically lending or borrowing. Thus, if a man's original income-

stream is $1000 this year and $1500 next year, and if, selling this income-stream, he buys with the proceeds another yielding $1100 this year and $1395 next year, he has not, nominally, borrowed $100 and repaid $105, but he has done what amounts to the same thing — increased his income-stream of this year by $100 and decreased that of next year by $105, the $100 being the modification produced in his income for the first year by selling his original income-stream and substituting the final one, and $105 being the reverse modification in next year's income.

We may divide society into the *spenders* and the *savers* or *investors*. Figures 44 and 45 show the contrast between them. A spender is a person who chooses to enjoy a

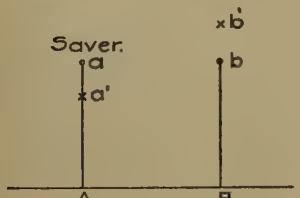


FIG. 44.

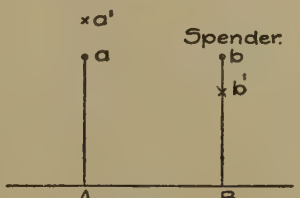


FIG. 45.

larger income in the present than in the future; a saver is a person who chooses to enjoy a smaller income in the present than in the future. We suppose that the incomes of the two are at first just the same, but the first man reacts to his present income-stream differently from the second man. He is a natural saver, thinks much of his future needs, and will, we shall suppose, have a rate of impatience below the rate of interest. He will therefore take away from his present income a certain amount in order to add to his future income, and will, as shown in Figure 44, adjust his income-stream so as to bring the present income-stream down from a to a' and his future income up from b to b'. The second man is a natural spender, and although he has the same income to start with, he wants more immediate income and is willing to sacrifice next year's

income to get it. This means that his rate of impatience is above the market rate of interest, and therefore he is a borrower and a spender. He will, then, as shown in Figure 45, add to his present income from a to a', and reduce his future income from b to b'.

§ 3. Futility of prohibiting Interest

We may now note that interest taking cannot be prevented by prohibiting loan contracts. To forbid the particular form of sale, called a loan contract, would leave possible other forms of sale, and, as has been shown, the valuation of every property right involves interest. If the prohibition should leave individuals free to deal in bonds, it is clear that virtually they should be still borrowing and lending, but under the name of "sale"; and if "bonds" were tabooed, they could merely change the name to "preferred stock." It can scarcely be supposed that any prohibition of interest taking would extend to the prohibition of all buying and selling; but as long as buying and selling of any kind were permitted, the virtual effect of lending and borrowing would be retained. The possessor of a forest of young trees, not being able to mortgage their future return, and being in need of an income-stream of a less deferred type than that receivable from the forest itself, would simply sell his forest and with the proceeds buy, say, a farm with a uniform flow of income, or a mine with a decreasing one. On the other hand, the possessor of a capital which is depreciating, that is, which represents an income-stream great now but steadily declining, and who is anxious to "save" instead of "spend," would sell his depreciating wealth and invest the proceeds in such instruments as the forest already mentioned.

It was in such a way, as, for instance, by "rent-purchase," that the medieval prohibitions of usury were rendered nugatory. Practically, at the worst, the effect of restrictive

laws is simply to hamper and make difficult the finer adjustments of the income-stream, compelling would-be borrowers to sell wealth yielding distant returns instead of mortgaging it, and would-be lenders to buy the same, instead of lending to the present owners. It is conceivable that "explicit" interest might disappear under such restrictions, but "implicit" interest would remain. The young forest sold for $10,000 would bear this price, as now, because it would be the discounted value of the estimated future income; and the price of the farm bought for $10,000 would be determined in like manner. The rate of discount in the two cases must be the same, because, by buying and selling, the various parties in the community would adjust their rates of impatience to a common level — an implicit rate of interest thus lurking in every contract, though never specifically appearing therein. Interest is too omnipresent a phenomenon to be eradicated by attacking any particular form; nor would any one undertake it who perceived the substance as well as the form. In substance, the rate of interest represents the terms on which the earlier and later elements of income-streams are exchangeable. Interest can never disappear until present and future dollars will exchange at par. This would imply that human beings were no longer impatient but considered it no hardship to wait indefinitely.

We have supposed each person's income to be "rigid," except as it is modified by borrowing and lending, or buying and selling. It will, however, make little difference if each income, instead of being rigid, is more or less flexible to start with. Often the same article may be used in more than one way. In such a case the owner merely chooses the way which gives the capital the highest value.

Since any time-shape may be transformed into any other, he need not be deterred from selecting an income because of its time-shape, but may choose it exclusively on the basis of maximum present value.

§ 4. Clearing the Loan Market

We have seen that from the standpoint of the individual, when a rate of interest is given, he will adjust his rate of impatience to correspond with that rate of interest.

For him the rate of interest is a relatively fixed fact, since his own rate of impatience and resulting action can affect it only infinitesimally. All he can do is to adjust his rate of impatience to it. For society as a whole, however, these rates of impatience determine the rate of interest. This corresponds to what was said as to the determination of prices. We have seen that each individual regards the market price, say, of coal as fixed, and adjusts his marginal desirability or undesirability to it; whereas, for the entire group forming the market, we know that these marginal desirabilities and undesirabilities fix the price of coal. In the same way, while for the individual the rate of interest determines the rate of impatience, for society the rates of impatience of the individuals determine the rate of interest. The rate of interest is simply the rate of impatience, upon which the whole community may concur in order that the market of loans may be exactly cleared. Supply and demand will work this out.

To put the matter in figures: if the rate of interest is set very high, say 20 per cent, there will be relatively few borrowers and many would-be lenders, so that the total extent to which would-be lenders are willing to reduce their income-streams for the present year for the sake of a much larger future income will be, say, $100,000,000; whereas, those who are willing to add to their present income at the high price of 20 per cent interest will borrow only, say, $1,000,000. Under such conditions the demand for loans is far short of the supply, and the rate of interest will therefore go down. At an interest rate of 10 per cent, the present year's income offered as loans might be $50,000,000, and the amount which would be taken at that rate only $20,000,000. There

is still an excess of supply over demand, and interest must needs fall further. At 5 per cent we may suppose the market cleared, borrowers and lenders being willing to take or give respectively $ 30,000,000. In like manner it can be shown that the rate would not fall below this, as in that case it would result in an excess of demand over supply, and cause the rate to rise again.

Thus the rate of interest is the common market rate of impatience for income, as determined by the supply and demand of present and future income. Those who, having a high rate of impatience, strive to acquire more present income at the cost of future income, and tend to raise the rate of interest. These are the borrowers, the spenders, the sellers of property yielding remote income, such as bonds and stocks. On the other hand, those who — having a low rate of impatience — strive to acquire more future income at the cost of present income, tend to lower the rate of interest. These are the lenders, the savers, the investors.

The mechanism just described will not only result in a rate which will clear the market for loans connecting the present with next year, but, applied to exchanges between the present and the remoter future, it will make similar adjustments. While some individuals may wish to exchange this year's income for next year's, others wish to exchange this year's income for that of the year after next, or for a portion of several years' future incomes. The rates of interest for these various periods are so adjusted as to clear the market for all the periods of time for which contracts are made. That is, supply and demand must be equal, so as to clear the market for every period of time.

§ 5. Historical Illustrations

We have now completed our study of the causes determining the rate of interest. If they are correct, we should find that the rate of interest is low (1) if in general the people

are by nature thrifty, farsighted, self-controlled, love their children, or (2) if they have large or descending income-streams; and that it is high (1) if the people are shiftless, shortsighted, impulsive, selfish, or (2) if they have small or ascending income-streams.

History shows that facts accord with these conclusions. The communities and nationalities which are most noted for the qualities mentioned — foresight, self-control, and regard for posterity — are probably Holland, Scotland, England, France. Among these people interest has been low. Moreover, they have been money lenders, they have the habit of thrift or accumulation, and their instruments of wealth are in general of the substantial variety.

On the other hand, among communities and peoples noted for lack of foresight and for negligence with respect to the future are China, India, Java, the negro communities in the Southern states, the peasant communities of Russia, and the North and South American Indians, both before and after they had been pushed to the wall by the white man. In all of these communities we find that interest is high, that there is a tendency to run into debt and to dissipate rather than accumulate capital, and that their dwellings and other instruments are of a very flimsy and perishable character, built for immediate, not remote, gratifications.

These examples illustrate the effect on the rate of interest of differences in human nature. We now turn to illustrations of differences in the time-shape of incomes. The most striking examples of increasing income-streams are found in new countries. It may be said that the United States has almost always belonged to this category.

In America we see exemplified on a very large scale the truth of the theory that a rising income-stream raises, and a falling income-stream depresses, the rate of interest, or that these conformations of the income-stream work out their effects in other equivalent forms. A similar causation may be seen in particular localities in the United States, espe-

cially where changes have been rapid, as in mining communities. In California, in the two decades between 1850 and 1870, following the discovery of gold, the income-stream of that state was increasing at a prodigious rate. During this period the rates of interest were abnormally high. The current rates in the "early days" were quoted at $1\frac{1}{2}$ to 2 per cent a month. "The thrifty Michael Reese is said to have half repented of a generous gift to the University of California, with the exclamation, 'Ah, but I lose the interest,' a very natural regret when interest was 24 per cent per annum." After railway connection in 1869, Eastern loans began to flow in. The decade 1870–1880 was one of transition during which the phenomenon of high interest was gradually replaced by the phenomenon of borrowing from outside. The residents of California were thus able to change the time-shape of their income-streams. The rate of interest consequently dropped from 11 per cent to 6 per cent.

The same phenomena of enormous interest rates were also exemplified in Colorado and the Klondike. There were many instances in both these places during the transition period from poverty to affluence, when loans were contracted at over 50 per cent per annum, and the borrowers regarded themselves as lucky to get rates so "low."

§ 6. Interest and Prices

We have seen that the rate of interest is not a mere technical phenomenon, restricted to Wall Street and other "money markets," but that it permeates all economic relations. It is the link which binds man to the future and by which he makes all his far-reaching decisions. It enters into the price of securities, land, and capital goods generally, as well as into rent, wages, and the value of all "interactions."

The rate of interest plays a central rôle in the theory of

prices. It applies to the determination of the price of wealth, property, and benefits. As was shown in previous chapters, the price of any article of wealth or property is equal to the discounted value of its expected future benefits. If the value of these benefits remains the same, a rise or fall in the rate of interest will consequently cause a fall or rise respectively in the value of all instruments of wealth. The extent of this fall or rise will be the greater, the farther into the future the benefits of wealth extend.

As to the influence of the rate of interest on the price of benefits, we first observe that benefits may be interactions or satisfactions. The value of interactions is derived from the succeeding future benefits to which they lead. For instance, the value to a farmer of the benefits of his land in affording pasture for sheep will depend upon the discounted value of the benefits of the flock in producing wool. In like manner, the value of the wool output to the woolen manufacturer is in turn influenced by the discounted value of the output of woolen cloth to which it contributes. In the next stage, the value of the production of woolen cloth will depend upon the discounted value of the income from the production of woolen clothing. Finally, the value of the last named will depend upon the expected income which the clothing will bring to those who wear it — in other words, upon the use of the clothes.

Thus the final benefits, consisting of the use of the clothes, will have an influence on the value of all the anterior benefits of tailoring, manufacturing cloth, producing wool, and pasturing sheep, while each of these anterior benefits, when discounted, will give the value of the respective capital which yields them; namely, the clothes, cloth, wool, sheep, and pasture. We find, therefore, that not only all articles of wealth, but also all the " interactions " which they render, are dependent upon final enjoyable uses, and are linked to these final uses by the rate of interest. If the rate of interest rises or falls, this chain will shrink or expand. The chain

hangs, so to speak, by its final link of enjoyable benefits, and its shrinkage or expansion will therefore be most felt by the links most distant from these final benefits. For instance, a change in the rate of interest will affect but slightly the price of making clothing, but it will affect considerably the price of pasturing sheep.

A study, therefore, of the theory of prices involves (1) a study of the laws which determine the final benefits on which the prices of anterior interactions depend; (2) a study of the prices of these anterior interactions, as dependent, through the rate of interest, on the final benefits; (3) a study of the price of capital instruments and capital property as dependent, through the rate of interest, upon the prices of their benefits. The first study, which seeks merely to determine the laws regulating the price of final benefits, is relatively independent of the rate of interest. The second and third, which seek to show the dependence on final benefits of the anterior benefits and of the capitals which bear them, involve and depend upon the rate of interest.

In the theory of prices we found that the ultimate elements supplied and demanded were satisfactions and efforts.

There is involved in each price *another* special price, viz. the rate of interest. Without the rate of interest we may only compare *simultaneous* satisfactions or efforts. *With* it we may compare *all that exist.* By means of the rate of interest any future satisfaction or effort is discounted, and thus translated into terms of present value. It enables us to pause at every step and appraise the interactions and capital which anticipate future satisfactions. In other words, by it we capitalize income and form our capital accounts.

Interest, then, is the universal time-price, linking impending and remote satisfactions or efforts or both. It is literally the previously missing link necessary for a complete comparison of efforts and satisfactions at all points of time.

The study of the rate of interest, therefore, rounds out and completes our study of prices.

§ 7. Classification of Price Influences

We may now fitly review the theory of prices by enumerating the various possible causes which might decrease the price of, let us say, pig iron. The price of pig iron may fall for any one or more of the following reasons: —

(1) *A rise in the marginal desirability of money due either to*
  (*a*) A rise in the purchasing power of money through
    I. A decrease in money or deposit currency, or
    II. A decrease in their velocities, or
    III. An increase in the volume of trade, or to
  (*b*) An impoverishment or reduction of incomes.
(2) *A fall in the marginal desirability of pig iron due either to*
  (*a*) An increased amount of pig iron through
    I. A decrease in its cost by
      1. A saving of waste.
      2. A saving of labor.
      3. A decrease in the price of iron ore or other prices entering into its cost.
      4. An increase in the price of by-products.
    II. A trade war.
  (*b*) A fall in the marginal desirability of a given amount of pig iron, through
    I. A decrease in the price of iron products through a decrease in the marginal desirability of the satisfactions they yield because of,
      1. An increase in their amount.
      2. A change in fashion, etc.
    II. An increase in substitutes.
    III. A decrease in completing articles.
    IV. An increase in the rate of interest through an increase in the marginal rates of impatience.
      1. From a change in incomes.
        (1) By steepening their time-shape.
        (2) By reducing their size.
        (3) By increasing their uncertainties.
      2. From a change in human nature.
        (1) By decreasing foresight.
        (2) By decreasing self-control.
        (3) By increasing shiftless habits.
        (4) By decreasing regard for posterity.

Back of these causes lie other causes, multiplying endlessly as we proceed backward.

But if we trace back all of these causes to their utmost limits, they will all resolve themselves into changes in the marginal desirability or undesirability of satisfactions and of efforts at different points of time and of the marginal rate of impatience as between any one year and the next.

CHAPTER XXIII

RENT

§ 1. Distribution according to Agents of Production and according to Owners

We began this book with a study of economic accounting. In this way we obtained a bird's-eye view of the whole field of economic science. At that time we had to take ready-made the materials for constructing our accounts. This material consisted of the *values* of various items, whether of capital or of income. These values consist in each case of two factors, the quantity of the goods valued and its price. We have now finished the study of one of these two factors, price, and there remains for us only the study of the other quantity. We have explained how the price of instruments, property rights, and benefits, which enter into capital and income accounts, is determined. We have still to explain how the quantities of instruments, property rights, and benefits are determined. What determines, for instance, the quantity of wheat which a given wheat field will produce; what determines the quantity of the wheat fields; what determines the quantities of the necessities, comforts, luxuries, and amusements of life which a nation or an individual possesses; what determines the quantities of human beings on a given area? Once we can explain these quantities, we need only multiply by the prices previously explained, and we have completed our task of explaining values. We shall then be able to explain — at least in general terms — why, for instance, the values of the capital or income in the capital accounts of some communities or individuals are so great and of others

so little; why the value of the benefits flowing from one piece of land is so great, and of another so small, and so forth.

Our purpose is not so much absolute, as relative, results. We care less about the absolute population of the globe than about population relatively to land. We care less about the world's total yield of wood than about the yield per capita of human beings, per acre of woodland, per loom, or per other unit of capital.

Our present search, then, is for relative quantities, or values. There are two sets of relative quantities, or values, which are of special importance in our study. One is the value of income per unit of physical capital which yields it, and the other is the quantity and value of income and of capital per human being who owns it. The first represents the distribution of income relatively to the agents which produce it. The second represents the distribution of income and of capital among their owners. The study of the first will occupy our attention in this and the following chapter.

§ 2. The Four Ratios of Income to Capital

Our present task, therefore, is to study the ratios of income to capital. As we learned at the beginning, both capital and income may be measured either in quantity or in value. The ratio of income to the capital which produces it takes four different forms, according as the income and the capital are measured in one or the other of these two ways. These four forms of the income-to-capital ratio are as follows: —

(1) There is the ratio of the *quantity* income, *i.e.* of the benefits per unit of time to the *quantity* of capital which yields those benefits. This may be called the *physical-productivity* of capital. Thus, if 10 acres of land, in a certain year, yield 60 bushels of wheat, the ratio of income

to capital, or the physical-productivity of this land, is 6 bushels per acre per year. Or if 10 looms will weave 500 yards of cloth in a day, the ratio of benefits to the quantity of capital, or the physical-productivity of the looms, is 50 yards per machine per day.

(2) There is the ratio of the *value* of the benefits to the *quantity* of the capital. This may be called the *value-productivity* of capital. Thus, if 10 acres of land yield a net return worth $200 a year, the value-productivity is $20 per acre per year. This is also called the " rent " of land. The same principles apply to the rent of any other article of capital. Another example of value-productivity is found in the wages of a laborer.

(3) There is also the ratio of the *quantity* of benefits to the *value* of the capital from which they flow. This may be called its *physical return*. Thus, if $100 worth of capital applied to land in the form, say, of agricultural implements adds 1 bushel to the yield of the land, the physical return of this accessory capital is $\frac{1}{100}$ of a bushel per year per dollar invested.

(4) There is finally the ratio of the *value* of benefits to the *value* of the capital yielding them. This may be called the *value return*. Thus, if a house worth $10,000 yields in any given year a net rent of $1000, the value return is 10 per cent per year.

Thus we have four ratios: —

1. $\frac{\text{Quantity of benefits per unit of time}}{\text{quantity of capital}}$ = physical-productivity.

2. $\frac{\text{Value of benefits per unit of time}}{\text{quantity of capital}}$ = value-productivity.

3. $\frac{\text{Quantity of benefits per unit of time}}{\text{value of capital}}$ = physical return.

4. $\frac{\text{Value of benefits per unit of time}}{\text{value of capital}}$ = value return.

These four magnitudes must be carefully distinguished. They are measured in totally different units, *e.g.*

The first, in bushels per acre per year.
The second, in dollars per acre per year.
The third, in bushels per dollar per year.
The fourth, in dollars per dollar per year.

Of these four ratios, the fourth has already been studied under the subject of the rate of interest. The third is of little importance. There are left, therefore, only the first and second. The first is chiefly a technical matter. The fertility of land, *e.g.* the number of bushels of wheat, oats, or corn per acre in Dakota, the efficiency of machinery, *e.g.* the number of yards which a given loom will weave or the number of cars a given locomotive will carry, the efficiency of workmen, or the number of yards of trench they can dig or the number of bricks they can lay. These are technical facts the study of which would lead us into the particular details of various sorts of business. In a sense, these particular studies are included within the domain of economic science under the special heads of Agricultural Economics, Railway Economics, or Industrial Efficiency; but in a book like the present, devoted to a mere general outline of economic science, we cannot enter into these details. Suffice it merely to say, therefore, that physical productivity depends on two chief factors: the *natural* capacities of men, land, and materials; and the *acquired* knowledge, skill, and organization (including division of labor) by which these natural capacities are utilized. Discoveries of new natural resources and every invention of industrial processes add from time to time to physical-productivity. The science of agriculture, for instance, has been revolutionized in the last few years with the result of greatly increasing the physical-productivity of land; and the inventions for applying mechanical power have multiplied, by large factors, the physical-productivity of machinery.

§ 3. Value-productivity in General

Given, then, these technical conditions of natural resources and acquired methods of utilizing them, let us pass at once to what now concerns us, the second of the four ratios, the value-productivity of capital, or the ratio of the value of the benefits flowing from any capital to the quantity of that capital. The value of the benefits is found by multiplying their quantity by their price. If we consider the quantity given by technical conditions and the price given by the principles already explained, we have only to multiply the two together in order to obtain the value desired, and then we have to divide this value by the quantity of the capital producing it — likewise supposed for the present to be given — in order to obtain the value-productivity desired. Thus, if in any community there are 1000 lodging rooms, the benefits of which have a price of $1 per night's lodging, and the total quantity of such benefits in a year is 300,000 night's lodging, then the value-productivity is evidently $\frac{\$1 \times 300{,}000}{1000}$ or $300 per year per room. In order to prepare these productivity data for practical applications, we must reduce them to classification. We shall first classify value-productivities according to whether the prices they bring are explicitly or implicitly given, explicitly by actual sale, or implicitly by mere appraisal. The explicit value productivity of an instrument is called, in economic parlance, hire. Hire may be either rent or wages according as the hired instrument is or is not a human being. The implicit value-productivity of an instrument is called profits. Each of these catagories of prices — explicit and implicit — may in turn be subdivided according to the kind of instruments to which they attach — whether, for instance, the instruments are human beings or not. The result of these two classifications is the following four classes of value-productivity: —

The value-productivity of a human being, if explicit, is called " explicit wages " or simply " wages."

The value-productivity of a human being, if implicit, is called " implicit wages " or " profits produced by men " or " enterprisers' profits."

The value-productivity of any other instrument, if explicit, is called " explicit rent " or simply " rent."

The value-productivity of any other instrument, if implicit, is called " implicit rent " or " profits of things " or " dividends."

Explicit rent and explicit wages are stipulated and certain. Implicit rent and implicit wages are (as is implied by their collective term, profits) subject to chance variations. The man who accepts stated payments for the use of his instruments for his own services avoids certain risks which the independent producer (or profit seeker) assumes. At the same time this former foregoes certain chances of gain which fall to the latter.

Thus, profits are " implicit " wages or rent, and implicit wages or rent are " commuted " profits.

§ 4. The Rent of Land

The remainder of this chapter will be devoted to a study of the four kinds of productivities just enumerated. We shall begin with rent — explicit and implicit. A " rented " house bears explicit rent, but even a house lived in by the owner has an *implicit* rent, *i.e.* whatever it would rent for under assumed conditions. The most common kinds of instruments which are explicitly rented are real estate, although many other more or less durable commodities such as furniture, horses and carriages, telephones, pianos, typewriters, and even clothing, may sometimes be explicitly rented.

Although a piece of real estate is usually rented as a whole, including both land and improvements thereon, sometimes

the land and the improvements are rented separately. The rent of land separated is called *ground rent*. Even when ground rent is not separated in contract, it may, for purposes of discussion, be separated in thought; so that all land bears *ground rent*, either explicit or implicit. Ground rent has been the subject of a vast amount of discussion. It underlies, for instance, the proposal called "the single tax," *i.e.* that all taxes be laid on ground rent.

There are two important peculiarities of land which are shared by very few other instruments. One of these peculiarities is that, practically speaking, the land in the world is fixed in quantity. Except by filling in tidal lands, and in a few other instances, we cannot add to the world's acreage; nor can we subtract from it. It is true that in some cases we may materially change the productivity or quality of it by irrigation, fertilizing, etc., on the one hand, or by exhaustion of the soil and other abuses on the other. These alterations in land are more important than has sometimes been recognized, and their importance is increasing. For the present, however, we shall assume a community in which the land is fixed, both in quality and quantity, possessing, as Ricardo expresses it, "natural and indestructible powers of the soil." For our purpose it is enough to assume that the land is indestructible. That it be natural is a matter of indifference; precisely the same principles of valuation apply to land wrested by our ancestors from the wilderness as to land solely a gift of nature.

The second peculiarity of land is that, though fixed in quantity, it varies in quality. Land is not a uniform or homogeneous article, like pig iron or granulated sugar, but consists of innumerable different grades suitable for almost innumerable different purposes. The prices of land have, therefore, a very wide range, and for the most part follow the principles of substitutes or competing articles.

It is true that the various lands are not all substitutes.

A city building site is not a substitute for wheat land, nor is it either a substitute for forest or mineral lands. But here, again, for the sake of simplicity, we shall assume that all lands do compete for precisely the same purpose, and differ only in productivity. Let us say that the product is wheat, and assume: —

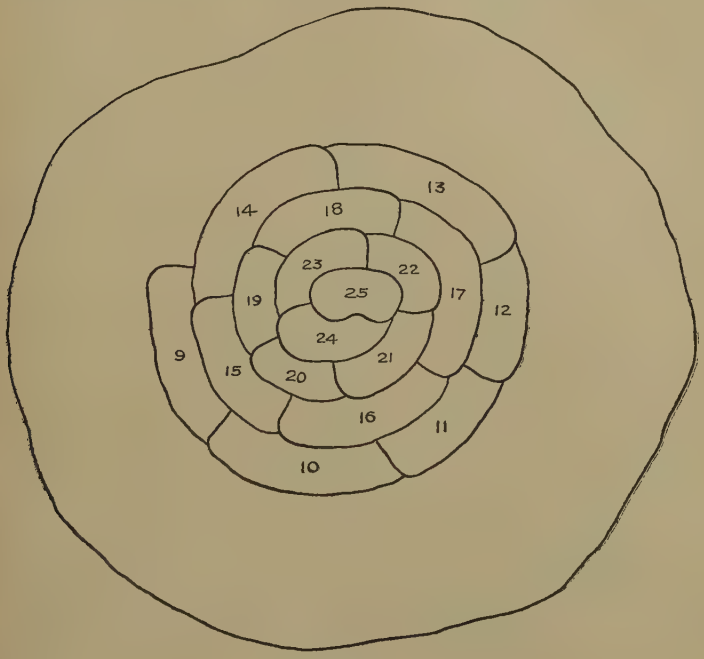


Fig. 46.

1. That the land under consideration is fixed in quantity.

2. That it varies in quality (*i.e.* productivity) by continuous gradation from very fertile to very infertile lands, each fixed and invariable as to productivity.

3. That the cost of tilling each acre is likewise fixed and invariable, say $10.

Let us suppose, as represented in Figure 46, an island fulfilling the two conditions above mentioned. In order

further to simplify the picture, let us suppose the most fertile land situated in the center capable of producing 25 bushels of wheat per acre per year, and the other lands arranged around it spiral fashion in the order of descending productivity. If the population can all be supported on the 25-bushel-per-acre land so that no other land is needed or believed to be needed in the future, no lands except this, the most fertile, will be used, and none will have value or yield rent. The reason is that the supply of land of the first quality, which may be had free, exceeds the amount demanded. We have seen that under such extreme conditions of supply and demand the price is low. No one will pay for the use of land when, without traveling farther than across a field, there is plenty of equally good land to be had for nothing. The *wheat*, however, will have a price equal, as previously explained, to its marginal desirability measured in money, and also to its marginal cost measured in money. But we have already assumed that this cost is fixed for each grade of land and the same for every bushel. Consequently *the price of wheat is in this case simply equal to the marginal cost of producing the wheat.* For, if sellers should try to sell above this cost, buyers would prefer to grow the wheat at that cost themselves. Hence the value of the 25 bushels produced on an acre of the first-grade land is only just equal to the cost of producing wheat there, which, as $10 per acre produces 25 bushels, is $\frac{10}{25}$ or 40 cents a bushel.

But if the population so changes as to create a demand for wheat which cannot be supplied from the most fertile land, some of the next grade of land will be used, yielding 24 bushels per acre. What was before true of only the first-grade land will then be true of this second-grade land. It will be valueless, and will yield no rent. But no longer will this be true of the first-grade land. It will have a value and yield a rent. For there will be a rise in the price of wheat. The price will still be equal to the marginal cost, *but now the marginal cost is the cost of producing a bushel on the*

second-grade land. The value of the 24 bushels produced on this land will now be equal to the cost of producing 24 bushels on that land, *i.e.* $10. This is $\frac{240}{14}$, or about 42 cents a bushel.

But since there cannot be two prices for the same article in the same market, the price of the wheat produced on the first-grade land must be the same. Consequently the owners of the first-grade land now have a crop worth more than the cost of producing it, and can now, if they choose, obtain a rent for it equal to the excess, *i.e.* 1 bushel per acre; for a tenant paying the equivalent of 1 bushel per acre would have 24 bushels for himself, which is exactly the same as he would get if he took up a claim for himself on the second-grade land; and if the landlord should attempt to charge more, he would lose his tenant, as the latter would then be better off on the second-grade land. If he charged less, he would be besieged by applications, and would put up his price. The market would be cleared by a rent of 1 bushel per acre. In money this is 42 cents per acre. If the owner does not rent his land to another, but enjoys the product himself, he is still said to obtain 42 cents an acre of implicit rent.

If the population changes again so as to require a resort to the third-grade land, the price will be still higher, viz. $\frac{10}{23}$ or $43\frac{1}{2}$ cents per bushel; and the rent of the first-grade land will rise to equal the difference between its productivity and that of the third-grade land, viz. 2 bushels per acre or $2 \times 43\frac{1}{2}$ cents $= 87$ cents per acre. Likewise the second-grade land will now bear a rent equal to its superiority over the third grade, viz. 1 bushel per acre or $43\frac{1}{2}$ cents. In the same way we may reckon the rent under other states of land occupation. In each case the rent of any grade of land is the difference between its productivity and the productivity of the worst or marginal land occupied. If, for instance, the lowest grade of land occupied is that indicated in the table as having a productivity of 9 bushels per acre,

the rent of the first grade is now 25 — 9 or 16 bushels per acre; that of the second grade, 24 — 9 or 15 bushels per acre; that of the next, 23 — 9 or 14 bushels per acre; and so on down to the worst land, which bears no rent. Since the price of wheat is, in all cases, its cost of production on the worst, or no-rent land, it will now be $10 for 9 bushels or $1.11 per bushel. Therefore in money the rents of the various lands from the best to the worst will be —

16 × $1.11 or $17.76 per acre.
15 × $1.11 or $16.65 per acre.
14 × $1.11 or $15.54 per acre.
Etc.

The last, worst, or no-rent land, is sometimes also called the " Ricardian acre " in honor of Ricardo, who first stated this doctrine of land rent. Its scientific designation is " marginal acre," *i.e.* it is the last acre whose cultivation can be made to pay. This marginal land in a sense fixes the rent of all other land and fixes the price of wheat. We have reached, then, two important results true under the conditions supposed.

1. The price of wheat is equal to its cost of production on the margin of cultivation.

2. Ground rent of any land is the difference between its productivity and that of land on the margin of cultivation (*i.e.* the worst cultivated).

With an increase of population, then, the price of wheat and the rent of wheat-land will rise, and the owner of good land will become gradually wealthier merely through the increase in population. He receives an increment in rent, sometimes called " the unearned increment," because it is due to no labor on his part. The value of land — that is, the capitalized or discounted rent — will increase with the unearned increment. It should be noted, however, that during the transition of rents from low to high, those who foresee a rise in rent will discount in advance the larger future rents. Not all so-called " unearned increments " are unexpected.

These conclusions hold absolutely under the conditions assumed. But in the actual world these exact conditions are never found.

1. Land is not absolutely fixed in quantity.

2. The productivity of any piece of land is not fixed, but varies from time to time both in kind and in intensity, and this productivity will vary with the price of wheat.

3. The cost of tilling land is not fixed, but varies with different land, and, indeed, as we shall presently show, is influenced by the price of the product.

The first consideration is of little practical importance. The second and third, however, require consideration. The productivity of land is not solely a matter of natural fertility. This might be the case with some mineral springs or oil wells, but in most cases each piece of land may be more or less *intensively* cultivated; and a rise in the price of wheat will stimulate wheat production on all lands, the better grades included. Thus, if the first grade produced 25 bushels when no other land was in use, it would produce more than 25 bushels as soon as the next grade was in use; and the worse the worst grade was, and the higher the price of wheat, the greater would be the amount grown by those cultivating the superior grades of land. In other words, a change in the price of land would not only affect the amount of land under cultivation, but the amount of cultivation of each piece of land. The productivity of each acre is not a constant quantity, but dependent on the price. Each acre will be cultivated up to that degree of intensity at which the last dollar's worth of cost will barely repay itself. That is, not only is there a margin of cultivation as to acres, — *i.e.*, the last acre which it pays to cultivate, — but there is also a margin of cultivation for every acre, good or bad, *i.e.* the last degree of effort or cost which it pays to put forth. Each acre will be tilled until this marginal cost of tilling agrees with the market price.

Moreover, the land may be capable of other uses than

wheat growing, and a change in the price of wheat may shift the use to which certain lands are put. No theory of land rent is complete which assumes that the differences in quality among lands is merely a matter of the amount of one product, like wheat.

Finally, as to the cost of tilling land per acre, this is not a constant quantity for all lands, both good and bad; nor is it constant even for the same land. The cost of tilling may be either higher or lower on good land than on bad land; and, as implied above, the cost on any land will vary with the price just as the product varies with the price, although in the opposite direction. The higher the price, the greater the marginal cost. This is the law of increasing cost applied to agriculture. It is also often called "the law of diminishing returns"; for to say that the cost of producing wheat continually increases with the amount produced is evidently the same thing as to say that the amount of wheat returned on each dollar of cost continually diminishes.

While, therefore, the theory of rent as above given is correct under the ideal conditions assumed, it is not absolutely correct under the actual conditions we find in the world. In an absolutely correct theory the numbers in Figure 46 must be conceived as increasing slightly as the margin of cultivation is extended, and the numbers expressing cost will not be simply a constant $10 per each acre, but will also increase slightly as the margin is extended. But these and the other modifications necessary to make the theory of ground rent true to life are so slight as not materially to change the practical results.

§ 5. Rent and Interest

The principles of ground rent apply also to house rent, piano rent, or any other rent, except that much greater modifications from such illustrative figures as we gave for ground rent will be necessary in these cases. In particular,

houses, pianos, etc., are not essentially fixed in quantity, but their quantity will be changed according to their rent (and their price, which is the discounted value of their rent).

The practical difference between ground rent and other rent, such as house rent, has an important illustration in taxation. It is not within the scope of this book to consider problems of taxation. We can only remark that a tax on ground rent falls on the landlord and does not appreciably affect the tenant, because it cannot affect the supply of land, which is practically fixed by nature; whereas a tax on house rent is borne partly by the tenant, because it discourages house building and affects the supply of houses.

The difference, then, between the rent of land and the rent of other instruments is a difference in the character of the supply. The supply of land is relatively fixed. Other instruments are reproducible. It is important to understand this difference and also not to confuse it with a common fallacy that land rent alone is truly rent, and house rent and other rent is really interest. It is easy to see that land rent is interest on the capital-value of the land just as truly as house rent is interest on the capital-value of the house. Both are rent and both are interest. In fact, rent and interest are simply two different ways of measuring the same income value. Rent is value-productivity; interest is value-return. We know that the value of income from any source may be expressed either relatively to *quantity* or to the *value* of that source. Rent is expressed in the first way; interest, in the second.

Let us suppose a *quantity* of land — 10 acres — to have a *value* of $1000, and that $50 a year is paid for its use. This $50 is both rent and interest. It is the rent on the 10 acres and the interest on the $1000. The rate of rent is $50 per year for 10 acres or $5 per acre per annum. The rate of interest is $50 per year for $1000 or 5 per cent per annum. In precisely the same way, let us suppose a *quantity* of houses — 10 houses — to have a *value* of $100,000, and that

$5000 a year is paid for their use. This $5000 is both rent and interest. It is the rent on 10 houses and the interest on $100,000. The rate of rent is $5000 per year for 10 houses or $500 per house per annum, and the rate of interest is $5000 per year for $100,000 or 5 per cent per annum.

The erroneous belief that land bears only rent, and other instruments bear only interest, is largely responsible for the narrow definitions of capital so often given and which are so framed as specifically to exclude land. A true analysis justifies the usage of business men who apply the term "rent" as freely to houses as to land, and the term "interest" as freely to income from land as to income from houses.

CHAPTER XXIV

WAGES

§ 1. Similarity of Rent and Wages

TURNING from the hire of things to the hire of persons, we find a similar but somewhat different problem. The rate of hire of human beings is called *wages*. In case these wages are very high, and are paid at rather long intervals, they are dignified by the name of *salaries*. But as the distinction between wages and salaries is not based on any scientific relation, we shall, for convenience, employ simply the one term " wages " to embrace what are ordinarily called salaries.

Corresponding to the distinction between explicit and implicit rent, we may distinguish between explicit and implicit wages, explicit wages being actual wages paid to the hired person, called the employee, by the person hiring him, called the employer; and implicit wages being the value-productivity or earnings of a person who does not sell his services but enjoys them himself. We may recapitulate the various sorts of hire, explicit and implicit, as follows: —

Explicit rent is payment for the use of instruments (other than human beings) which are hired.

Implicit rent is the value of net income from instruments (other than human beings) which are not hired.

Explicit wages are the payment for the services of human beings who are hired.

Implicit wages are the net income earned by human beings who are not hired.

The principles governing the rate of wages are, in a gen-

eral way, similar to those governing the rate of rent. The rate of a man's wages per unit of time is the product of the price *per piece* of the work he turns out multiplied by his productivity. His productivity depends on technical conditions, including especially his size, strength, skill, and cleverness, while the price per piece of his services depends upon the general principles of supply and demand as already stated.

The productivity of any capital, whether human or external, will differ with the capital, and there will be differences in productivity or quality. Men differ in quality, that is, in productive power, as truly as lands or other instruments differ. Some men have a high degree of earning power and some have not. Some men can work twice as fast as others. Some men can do higher grades of work than others. The result is that we find men classified as common manual laborers, skilled manual laborers, common mental workers, superintending workers, and enterprisers, or men who take important initiative in conducting industrial operations. Just as we can measure the rent of any land by the difference in productivity between that and the low-rent, or no-rent, land, in exactly the same way we can measure the difference in productivity between men. There is no grade of workmen called the " no-wages men," but there would be such a grade if it were customary for their employer to pay for their cost or support (as the employer of land pays for its cost), so that only the excess above this cost were to be called wages. There are men so incompetent that their net earning power is practically zero, and they can barely, if at all, earn enough to support themselves. These incompetents may be unfortunates, as in the case of invalids and imbeciles, or guilty of laziness, as in the case of indolents. But whatever the cause may be, they correspond in economic analysis to no-rent land.

§ 2. Peculiarities of Labor Supply

But owing to the fundamental fact that a laborer, unlike any other instrument, is owned by himself and not, except in slavery, by another, there are certain peculiarities of wages as compared with rent. These peculiarities lie in the supply curve. We shall note four such peculiarities.

In the first place, the supply curve of human services ascends very rapidly and often even "curls back," as previously explained. This peculiarity, as we saw, was due to the fact that a man's desire for more money (marginal desirability of money) decreases rapidly with an increase of his earnings. Beyond a certain point the more he is paid, the less he will work. We may state the same fact in the reverse direction, and say that under certain circumstances the less a man is paid, the harder he will work. The shape of his supply curve will depend in very large measure on whether or not he has other sources of income besides his work. Figure 47 exhibits this fact.

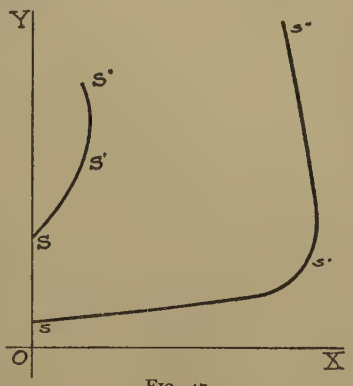


FIG. 47

The curve $S\ S'\ S''$ represents the supply curve of work for a rich man who has income from other sources than his work, and the curve $s\ s'\ s''$ that for a poor man, who has to depend on what he can earn. The rich man will not work at all for any wages below a certain price, represented in the diagram by OS. Any price above this will induce him to work a little, but if the price exceeds the height of S', the result will be that he will work less rather than more. These relations correspond with observed facts. A millionaire will not work for a dollar a day. He may work a

few days in the year for $100 a day, and work more days for $500 a day, but $1000 a day may lead him to work fewer days, and devote more time to vacations and to enjoying his large income.

The poor man will be guided by similar considerations, but on a smaller scale vertically and a larger one horizontally, — if the measure of work in each case is in hours of work. Having little or no property besides his person, he cannot afford to be idle. Unemployment for him is seldom voluntary. So long as he can get a price for his work sufficient to keep him out of the poorhouse, he will work for that price. Thus, the minimum price *Os*, which is necessary to induce him to work rather than become a tramp or beggar, is almost nothing at all; and it takes only a relatively slight rise in that price to set him working full time. The height of *s′* represents the price at which he will work the greatest number of hours. Above this he will prefer slightly shorter hours. As already stated, it is probable that the eight-hour movement to-day is partly due to the fact that wages are high enough to enable the laborer to afford some leisure instead of being so low as to "keep his nose close to the grindstone."

A reduction in wages works in the opposite way, making workmen willing to work longer hours and for lower wages. Only when the price falls much below the elbow at *s′* will they refuse longer to endure the low wages and long hours. They will then prefer, if not to starve, to throw themselves upon the mercy and charity of the community. The general level of the curve between the elbow *s′* and the beginning *s* represents their minimum *standard of living* which they require if they work at all.

Now, if wages keep high and the workmen have a sufficiently low "rate of impatience" to enable them to accumulate savings, they become more "independent," which, as applied to their supply curves *s s′ s″* means that it shifts a little toward the rich man's supply curve *s s′ s″*.

The result is a higher minimum wage necessary to induce the laborer to work and a lower maximum number of hours which he is willing to work. The intersection with the demand curve will therefore be higher and farther to the left; that is, the market rate of wages will be higher and the hours worked fewer.

This result is not due to any reduction in the number of workmen, but simply to a reduction in their desire for more money. Savings, therefore, making workmen more independent and less necessitous, will — by lessening their desire for money — both increase their wages and shorten their hours.

A second peculiarity in regard to wages is that, except under slavery, the earnings of a laborer are seldom discounted so as to ascertain his capital-value. The reason for making an appraisement usually has reference to some proposed sale; and, as working men and women are no longer for sale, their capital-value is seldom computed. For this reason, wages, unlike rent, are not often regarded in the light of interest on the capital-value of the men who earn them.

A third peculiarity of wages is one already alluded to, viz. that in practice they are always reckoned as gross and never as net. This is because the wages are reckoned from the standpoint of the employer who pays them, and not of the laborer who receives them. Under slavery the case was different, and the net income earned by a slave was computed in the same way as the net income earned by a horse — by deducting from the value of the work done the cost of supporting the slave. But under the system of free labor which now prevails the employer has no such cost. The laborer assumes his own support, and furnishes only his work to the employer. The net wages of the laborer, if they are to be computed at all, are to be found by allowing for the irksomeness of his work *i.e.* the real costs which he bears of labor and trouble. At the margin — that is, for

the last unit of work done — this cost is, as we have seen, equal to the wages received for it; but on all earlier units of work there is a gain of desirability which can be appraised in money. The net wages thus reckoned will be only a part of the wages as ordinarily quoted.

When, therefore, we compare the $500 a year which a workman gets by selling his work with the $500 a year which a bondholder gets as interest, we must not forget that the workman's $500 is really less valuable than the bondholder's $500, and for two reasons. One is the reason just given, that the workman's $500 is obtained only by the sweat of his brow, while the bondholder's is all clear gain; the other reason is that the workman's $500 will cease at his death or disablement, while the bondholder's goes on forever.

A fourth peculiarity concerning wages is that the supply of wage earners differs from the supply of any other instrument. Except in slavery, workmen are not bred like cattle on commercial principles. A rise in the price of the services of a draft horse will increase the demand for draft horses, and the result will be that both the market price and the amount supplied at that price will be increased. Those who supply draft horses will breed them to take advantage of the higher prices of them and their services. A rise in the price of human services will not act so simply. It is true that a rise in wages usually increases the number of marriages and often increases the birth rate, but such is not always or necessarily the result; and even when births do increase in number, they do not increase to exactly the same extent as draft horses are bred. It is an exceptional father who can think or say as did a cynical old farmer who had raised a large family and thriftily turned their child labor to early account for his own benefit: "My children have been the best crop I ever raised." Ordinarily parents view their children not as potential earning power but as objects of affection, and either do not attempt to

regulate their numbers, or do so with reference to consideration for their own or their children's comfort. The principles which regulate the number of laborers are part of the principles regulating population in general, and will be considered in the next chapter.

§ 3. The Demand for Labor

Turning now from the supply to the demand side of the market, we find that the demand of employers for workmen is in general quite analogous to their demand for the services of land or any other productive agent. Sentiment and humanity have a little influence, but not enough to require special attention on our part. Wages are paid by the ordinary employer as the equivalent of the discounted future benefits which the laborer's work will bring to him, — the employer, — and the rate he his willing to pay is equal to the marginal desirability of the laborer's services measured in money. We wish to emphasize that the employer's valuation is (1) marginal, and (2) discounted. The employer pays for all his workmen's services on the basis of the services least desirable to him, just as the purchaser of coal buys it all on the basis of the ton least desirable to him; he watches the " marginal " benefits he gets exactly as does the purchaser of coal. At a given rate of wages he " buys labor " up to the point where the last or marginal man's work is barely worth paying for. This marginal unit of work is a sort of barometer of wages.

Secondly, wages which the employer pays are the *discounted* value of the future benefits he receives. Thus, the shepherd hired by the farmer to tend the sheep in the pasture renders benefits the value of which to the farmer is estimated in precisely the same way as the value of the benefits of the land which he hires. It follows that the rate of wages is dependent upon the rate of interest.

A rise in the rate of interest will produce a fall in the

rate of wages by lowering the discounted value of the services of workmen, and therefore lowering the prices which suppliers are willing to pay. Contrariwise, a fall in interest produces a rise in wages.

Conformable to the previous reasoning, the dependence of wages on the rate of interest is the more pronounced, the more remote are the ultimate benefits to which the work of the laborer leads. In a community where the workmen are largely employed in enterprises requiring a long time, such as digging tunnels and constructing other great engineering work, the rate of wages will tend to fall appreciably with a rise in the rate of interest, and to rise appreciably with a fall in the rate of interest; whereas in a country where the laborers are largely engaged in personal service or in other work which is not far distant from the final goal of enjoyable benefits, a change in the rate of interest will affect the rate of wages but slightly.

Moreover, a change in interest will divert laborers from one employment to another. If interest rises, it will divert labor from enterprises which require much time and in which, therefore, the high interest is a serious consideration, and turn it into enterprises which yield more immediate benefits. For example, the higher the rate of interest, the less relatively will laborers be employed in constructing great canals and the more relatively will they be employed as domestic servants, and *vice versa*.

We have now considered wages under conditions of competition. Under competition they are determined — like any other competitive price — by the familiar principles of supply and demand. If, instead of competition, we have conditions of more or less perfect monopoly, the principles of wage determination will change accordingly and in the manner previously explained, for monopoly. If employers form combinations called trusts, or if laborers form combinations called trades unions, there will be an effect on the rate of wages. These combinations tend to

render bargaining collective instead of competitive, and the efforts on the two sides of the market take the form of struggles called strikes and lockouts. The fuller consideration of these subjects belongs to applied economics.

§ 4. General Influences on Rents and Wages

The sum of all the rents and wages, explicit and implicit, in any community is, of course, the total income of that community. An inventory of rent and wages would show what quota was contributed to this total by human beings, land, and other instruments. It would be simply a list of the net incomes from all these. By far the larger part is contributed by human beings. Professor Nicholson of Edinburgh has estimated that in England the income earned by what he calls " the living capital " of Great Britain is five times as great as that earned by the " dead capital." In less wealthy countries the preponderance of man-produced income is probably still larger. Of the part produced by " dead capital " the larger portion is from land. A statement of the parts of total income due to various agents, such as laborers, land, and other capital which together yield that income, constitutes the distribution of income relatively to the capital which produces it.

It should be noted that though each of the various laborers, lands, and other instruments which jointly produce income, is credited with a certain part, it could not produce this part alone, or by itself. The earnings of a railway are due, for instance, to the joint work of the locomotive, cars, roadbed, terminals, and employees. These are not independent but mutually *completing* instruments, and their services are completing services. We *impute* to each a certain part, determined according to the principles which regulate the prices of completing goods.

In a new country the rent of land is apt to be low, but rent of other things and wages high. For in such a country land

is abundant, but other forms of capital, including laborers, relatively scarce. As a country grows older and more populous, land rent tends to rise, and other rents and wages to fall.

Progress in scientific knowledge causing an increase in productivity of land is like the rejuvenation of a country. Any increase in general productivities, whether of land or of other agents of production, has a tendency to make the *rate* of wages increase; for (1) by increasing the wealth of employers, and thereby diminishing the marginal desirability of money, there is a tendency to increase their demand for everything, including the services of workmen; and (2) so far as workmen themselves are owners of houses, implements, and other instruments of any kind, and thus share in the increased affluence, the supply of work they offer is decreased, as we have seen.

Such a result is probably the chief general effect of so-called labor-saving machinery. It increases the income of other classes than laborers, and with it their power to buy work of laborers. The first effect, however, is for the labor-saving machine to displace laborers, with which, in fact, they are competing articles, and we have seen that the increase in one of two competing articles or substitutes tends to lower the price of the other. The individual laborers thus displaced are likely to be injured by the improvement, being unable to learn another trade without undue loss of time. It is even conceivable that labor-saving machinery might become so automatic and so fully a substitute for human work that there would be no need and no demand for such work. But such an effect seems very improbable. The human machine is so much more *versatile* than other machines, its *competing* with labor-saving machines is not as important as its *completing* them. As a matter of history, so-called labor-saving machinery, while it "saves" or displaces laborers from one sort of work, often if not usually produces new needs for them in another sort of work. If

horses and carriages were introduced into China, they would largely dispense with the need of coolies, who now carry passengers in sedan chairs, but they would call for coachmen and grooms. When in turn stage coaches give place to railways, the trade of drivers of stage coaches becomes obsolete, but the new trades of locomotive engineers, firemen, conductors, and brakemen are created. In fact, the very names of these occupations, as of hundreds of others, show that the demand for these sorts of work arises from the existence of machinery. In other words, labor-saving machinery, while, as its name implies, is always a *competing* article with the human machine with respect to some of its many-sided capacities, usually also is a *completing* article with respect to some other capacity; and we have seen that an increase in the quantity of one of two *completing* articles tends to *increase* the price of the other.

But while a general increase in the incomes enjoyed by a community usually tends to increase the rate of wages, an increased *inequality* of incomes may have the reverse effect. At any rate, a decrease in the amount of capital which laborers own will, as we have already seen, make them willing to take lower wages than otherwise. In fact, the chief reason that there exists a wage class is that those constituting it have little or no capital apart from their own persons. Wage earners are chiefly "propertyless" persons, persons who either never had or inherited any property, or who lost what they did have, as, for instance through too high a "rate of impatience." We see, therefore, that the question of wages depends, among other things,on the distribution of the ownership of wealth. This will be the subject of the next chapter.

CHAPTER XXV

OPULENCE AND POVERTY

§ 1. The Problems of Opulence and Poverty

In the two preceding chapters we have considered the distribution of income relatively to the agents or instruments which produce income. In the present chapter we shall consider the distribution of this same income relatively to those who own and enjoy it. The two sorts of distribution are quite different, although there has been a tendency to confuse them. This was natural, for in the early days of economics people were classified roughly according to the sort of instruments they owned. There was the landlord class, whose chief income was ground rent, the non-landed capitalist, whose chief income was from other capital than land, and the laborer, whose chief income was wages. It was then natural to imagine that the incomes produced by laborers, by land, and by other capital, were also the incomes enjoyed by laborers, by landlords, and by other capitalists. But even were such a classification possible and duly made, it would still fail to tell us anything whatever as to how large was the *per capita* share within each class, or whether the amounts enjoyed by different individuals were or were not very unequal. The best we could say would be that certain land yields a rent of $10 an acre, and other lands more or less than this; that certain houses rent for $1000 a year, and others for more or less; that money lenders make 5 per cent on their loans; and that ordinary wage earners get $2 a day. But these data, however detailed, would not tell us the actual income enjoyed by any single person, except in the case of the laborer,

and then only on the assumption that he derived no income from any other source than from his work. Furthermore, to-day there are only small traces left of the old social stratification, and correspondingly little excuse for confusing the distribution of income by the capital which yields it and by the persons who own it.

But, though the two sorts of distribution are distinct, each is needed to understand the other. The last two chapters were devoted to the first sort of distribution, and have prepared us for the study of the second sort.

The problem now before us — distribution relatively to owners — may be described as the problem of the total income, the average income, and the relative numbers of people owning incomes of various sizes. The last-named part of the problem is the problem of grading the population according to income — the problem of discriminating the relatively rich and poor. No other problem in economics has as great a human interest as this, and yet scarcely any other problem has received so little scientific study.

Since income necessarily comes from capital, — at any rate if human beings be included, — the " distribution " of income is likewise the " distribution " of capital. Our problem may therefore be stated either as the problem of the personal distribution of income or that of the personal distribution of capital. Still more simply it is the problem of " the distribution of wealth."

For the purpose of comparing the wealth of different persons or nations, values are more important than quantities. If we know that Mr. A's income is worth $1000 a year and Mr. B's $10,000, we may say that Mr. B's income is ten times Mr. A's in the sense that the elements composing B's income are worth in exchange ten times the elements composing A's income; or if we know that X is " worth " (*i.e.* owns capital worth) $1,000,000 and that Y " is worth " $10,000,000, we may say in like sense that Y's capital is tenfold X's.

In order to compare the incomes or capitals of widely distant times or places, a correction may need to be made for difference in the purchasing power of money, and if the rate of interest is also different in the two cases, the correction will not necessarily be the same for the capital as for income. A millionaire worth $1,000,000 in California half a century ago, the rate of interest being 12 per cent, commanded an income equivalent to that of a multimillionaire to-day, worth $3,000,000, for the present rate of interest is only one third as high. Another point of difference between comparisons of capital value and comparisons of income value lies in the fact that while capitalv alues differ only in *size*, income values differ also in time-shape and certainty. For this reason a man rich in lands from which there is little immediate income — but only prospects of income in the distant future — is sometimes called " land poor," having much land but little immediate income.

But when, instead of comparing the *wealth* of different persons or nations, we are seeking to compare the absolute comforts they enjoy, it is more important to consider quantities than values. In fact, as noted at the outset of our study, money valuations are apt to be misleading. A country where water is scarce will have a higher money valuation on its water supply than a country where water is so abundant as to have no price. Thus, a large quantity of water shows more affluence in the sense of comfort than does a large value of water.

Practically, however, if we confine our attention to modern times and conditions in Western Europe and America, it is true, in a general way, that of two nations or individuals the one which is richer in capital goods is richer also in capital-value, in income goods and in income values. For simplicity we shall hereafter assume that these four comparisons are thus similar. We may say that a man is " rich " if he has a large amount of capital goods of various kinds — lands, houses, stocks, bonds, etc.;

or a large money value of capital goods; or a large amount of benefits of various kinds — nourishment, clothing, shelter, amusements, etc.; or a large money value of benefits of these kinds.

A man is "poor" if he has small amounts of all these things.

Of course the two terms "rich" and "poor" are purely relative, and represent no deeper scientific meaning. A man who is rich according to one standard may be poor according to another. But the two terms are very convenient to designate relative conditions. Corresponding to the adjectives "rich" and "poor" are the nouns "opulence" and "poverty." Our subject, then, in this chapter is comparative opulence and poverty, both of nations and of individuals.

§ 2. National Opulence or Poverty

We may divide this subject into two heads: the opulence or poverty of nations and the opulence or poverty of individuals. First as to the opulence or poverty of nations. "The wealth of nations" is composed of three things, — its people, its lands, and the capital the people have produced from the land. These three items of which capital is composed are mentioned in order of relative importance. The income earned by the people of a nation always far exceeds the income earned by all its other wealth. Yet people do not earn income without at least land. Given laborers and land, we have the only two real requisites of producing income. Other capital springs from these two. It is sometimes said labor is the father, land the mother, and the other kinds of capital the children. A nation, then, is the richer, the larger the number of its inhabitants, the greater the extent of its territory, and the greater the amount of its accumulated products. These three groups or classes of capital depend each on somewhat different conditions.

The amount of land and its power to produce is largely a question of natural resources. It may be taken as a given quantity presented to man by nature. It is now becoming recognized, however, that land is not so definitely constant in its power to produce as was once imagined. One of the most important results of the recent "conservation movement" in this country is to show conclusively that land is not altogether a constant source of income, but that it is possible by the impoverishing and washing away of top soil to greatly impair or destroy absolutely the productivity of land; while on the contrary by proper fertilization, keeping land fallow, rotation of crops, etc., it is possible to increase the efficiency of land just as it is possible to increase the efficiency of other instruments.

The dominion over land by any given group of men may depend on wresting it by military force from another group. In fact one of the chief objects of war has been to increase national wealth by adding to territory. This was a chief object of the Roman Empire and of the colonial system of Great Britain. These and other nations have had what is called "earth hunger." The wealth of the British Empire to-day lies for the most part outside of the British Isles; for England owns India, Canada, Australia, and parts of Africa. Except for the war of the Revolution, she would now be owning the territory occupied by the United States.

The number of inhabitants in the nation depends in turn upon the extent of the territory as also on the past history of the nation and on other conditions which will be considered later in this chapter. Many nations have sought to increase their wealth and power by increasing their population. In fact, the chief reason for extending a nation's territory has been to fill it with colonists. A country is usually alarmed at the prospect of a stationary or decreasing population. France is now trying to conserve its population, recognizing that national strength for future wars or for future political position among the nations of

the earth depends largely on the numbers of fighters and of workers. The productiveness of these people as well as the productiveness of the lands they keep will depend largely upon their condition as to vitality and accumulated knowledge.

We come last to the amount of accumulated products. This depends on two chief qualities, first those causes like thrift which we have seen lead to saving, and second invention which has led to the creation of income-producing instruments.

§ 3. Per Capita Opulence or Poverty

So much for the conditions determining the opulence of nations. We may pass now to the more important subject of opulence or poverty of individuals. This subject may be divided into two parts: the study of average or per capita wealth, and the study of its distribution or the relative opulence and poverty among different individuals. By the per capita wealth of any nation is meant the quotient found by dividing the total wealth by the number of inhabitants. It is evident that two nations may compare very differently as to aggregate and as to per capita wealth. The small countries, Holland and Switzerland, when compared with the large countries, India and China, are far poorer in aggregate wealth, but far richer in per capita wealth. The per capita wealth in any nation will thus increase with an increase in the total wealth and decrease with an increase in population.

With the advent of Democracy in politics has come a greater emphasis on per capita as compared with aggregate wealth. Under autocracies the aim was to increase the wealth of the nation as a whole, partly for the personal aggrandisement of the autocrat or potentate, who often regarded himself as a sort of owner of the nation ("*l'etat, c'est moi*"), and partly because the sentiment of nationa

greatness was satisfied in this way. Under these conditions an increase in population was almost invariably welcomed and encouraged. But since the individuals of the nation have become its rulers and, so to speak, shareholders, they have regarded increase of numbers with mixed feelings; for while on one hand they welcome an increase in the total wealth which a greater population brings, they do not relish a decrease in the per capita wealth which may ensue. In the Democratic ideal, therefore, an increase of population is usually welcomed only in a new country where there is plenty of land, or in a country acquiring colonies to provide room for a surplus population.

The effect of an increase of national wealth on per capita wealth will evidently depend upon the ratio between land and population. In a sparsely settled country an increase of population will not only increase the aggregate, but the per capita wealth. When, however, the country is settled and filled up with population to a certain point, the opposite becomes true and a fresh increase of population, while continuing to increase aggregate wealth, will decrease per capita wealth. This fact sets a sort of elastic limit to an increase of population. That there must be such a limit is evident since an indefinite number of people cannot be supported on one acre of land. We know as a generalization from ordinary observation that the billion and a half people now living on this planet could not be supported if all packed into the state of Rhode Island and dependent on Rhode Island for sustenance. Per capita poverty would then be so intense that people would die of actual starvation. Long before such a starvation point is reached, every increase of population beyond a certain point results in an increased death rate. In fact, statistics show that the death rate increases as per capita wealth decreases. This fact is due to the unsanitary conditions which poverty necessarily brings, conditions not so much with respect to the quantity of food as with respect to its quality and with

respect to the quantity and quality of housing and other comforts and conveniencies of life — and perhaps above all with respect to conditions of employment, especially hours of labor. We have, then, ample evidence that when the ratio of population to land becomes excessive, the death rate is increased, and consequently a further increase of population is injurious to the individual.

When population is sparse, the opposite is true. The history of new countries shows that an increase in population is a blessing as well individually as collectively.

This law of per capita wealth is chiefly based on the anterior fact that land is an essential agent in production and that each successive increase in the productivity of land is acquired at increasingly great cost — or, expressed otherwise, that with each successive increase in cost, the return diminishes. This is the law of diminishing returns in agriculture. There is then, based on facts, a general law of per capita wealth in relation to population. It may be stated as follows: Given a particular stage of knowledge and of the arts and of other conditions that determine productivity, an increase of population first increases and then decreases the per capita wealth.

§ 4. Principles of Population

The population of any country may be increased either by births or immigration and decreased by deaths or emigration. The population in general, as a whole, can be increased only by births and decreased by deaths. As we are more interested in general than in local increases or decreases in population, we may overlook the questions of emigration and immigration, assuming for the area under consideration that they are either absent or balance each other.

With this proviso, we may say that the population of a country will decrease if the death rate exceeds the birth rate

and will increase if the birth rate exceeds the death rate. As we have already stated, the facts show that the death rate increases with a decrease in per capita wealth. The birth rate remains to be considered. When Malthus wrote his famous "Principle of Population," it was in general true that an increase in per capita wealth produced an increase in the birth rate. To-day this is true only to a certain extent. We shall for the moment, however, assume it to be universally true. Under these conditions we may say that an increase in per capita wealth tends to increase the birth rate and to decrease the death rate, and that a decrease in per capita wealth tends to increase the death rate and to decrease the birth rate.

If we assume what history has almost invariably shown to be the fact, that in a sparsely settled country the birth rate exceeds the death rate, so that the population tends at first to increase, we are now in a position to state what will happen to the population of that country in future generations, quite apart from any increase in immigration. By hypothesis the population will increase at first and, as at first each increase in population brings an increase in per capita wealth, it will continue to increase as long as this condition continues. But as we have seen, it will ultimately happen that per capita wealth will cease to increase and will begin to diminish. It will then happen that the death rate will increase and the birth rate decrease, so that the increase of population will be slackened and ultimately cease altogether. Under these conditions, then, a new country will be filled with population up to a certain point at which it will cease. The population is then in a sort of equilibrium, the birth rate equaling the death rate because the per capita wealth has been reduced to such a point as to bring this equilibrium about.

The law of population therefore may be stated as follows: Assuming that in a sparsely settled country the population will at first increase, and knowing that as the

per capita wealth decreases the death rate will increase, and the birth rate decrease and therefore the rate of increase of population slacken and ultimately terminate, we have an increase of population followed by stationary population, the stationary point representing an equality between the birth rate and death rate because people are either unable or unwilling to lessen the rate of subsistence thus reached.

This limit on human population is the same limit which nature sets on animal and plant population. Blades of grass multiply until they cover the ground on which they grow. When grass is sown on a grass plot, it multiplies with great rapidity, but after the whole plot is covered and there is no room for more, the number of blades remains nearly stationary. There is a struggle for life constantly going on and the death rate thus produced is great enough to balance the birth rate which the capacity of the soil allows. Out of this struggle for existence among animals and plants comes what Darwin calls natural "selection," and it is interesting to know that Darwin's first idea of such a struggle came from reading Malthus on Population. Population is then said to be limited by subsistence.

Since Malthus's day, as a consequence of his doctrines and advice, there has come into more definite operation what he called the "voluntary check" on population. While it is still true that *among the poor* it usually happens that an increase in per capita wealth tends to increase the birth rate by encouraging marriages or making them earlier or increasing the number of children per marriage, it has become unfortunately true that *among the wealthier classes* an increase in wealth tends sometimes in the opposite direction. Instead of wealth being then thought of as a means of supporting children, it comes to be thought of as a chief end in life, and the more of it gained the more ambitious are its possessors that its enjoyment may not be interfered with by childbearing, or that it shall not be decreased by subdivision in the next generation. The result is that the

wealthier classes often have, on the average, smaller families than the poorer classes. We must, therefore, modify the law of population so as to read that an increase in per capita wealth instead of tending always to increase the death rate tends first to increase it and then to decrease it. This wealth check to population is peculiar. It is quite different from the poverty check. The poverty check works automatically so as to check population when it is too large and not to check it when it is too small. But the wealth check acts in the opposite way — or rather it would do so if it were sufficiently strong and general, which is not yet the case. Then it would come about that the greater the per capita wealth the more would population be checked, and as the check to population usually tends to increase per capita wealth, this would still further decrease population. The logical result is depopulation or "race suicide."

At present however, this wealth check is confined to certain parts of the population and results, for those parts only, in "race suicide." These parts include particularly the so-called "better classes" of the population. Children of college graduates are less numerous than the graduates themselves. Thus, besides depopulation, there is another danger, degeneration. If the vitality or vital capital is impaired by a breeding of the worst and a cessation of the breeding of the best, no greater calamity could be imagined. But while the risk of such a result undoubtedly exists, this is not immediate, and an increasing realization of its possibility, we may hope, will lead to some way of counteracting it. A method of producing the contrary result — namely, producing from the best and suppressing from the worst — has been suggested by Sir Francis Galton under the name of "eugenics."

§ 5. Distribution of Wealth

Having considered aggregate and per capita wealth, we come finally to the distribution of wealth among different

individuals. Although a whole nation may be rich or poor relatively to another nation, the widest differences between nations are small as compared with the differences *within* any one nation. Every nation has its extremely poor, its extremely rich, and its classes in intermediate states. In the United States there are many wage earners who cannot earn $1 a day and who have no income except what they earn by labor, while at the opposite extreme are the multimillionaires who receive incomes of over $1,000,000 a month.

What are the reasons for such prodigious inequalities in the personal distribution of wealth? Are such inequalities injurious? If so, are they preventable? If so, by what means? These are some of the most burning questions of the day. Out of them spring many reform movements, and especially socialism. But these, like other practical problems, are applications of economic principles, and cannot be discussed in a book designed to treat only of economic principles themselves. Suffice it to say that no proper answer can be made to the last question of how to cure the unequal distribution of wealth until we have answered the first question of what causes this unequal distribution. As often happens, more study has already been devoted to cure than to diagnosis, and with the usual ineffective result of quack remedies.

Our present object will be to set forth the causes which affect the relative personal distribution of wealth. Whatever these causes may be, they are evidently fundamental and universal; for we find that extremes of poverty and riches have existed at all times and places. They are mentioned in the Bible and other histories of peoples in all ages and stages of civilizations. It is probable that the *degree* of inequality differs as between the Oriental civilizations, like China and India, and the Occidental, like England and France, and also as between the older nations of western civilization like Russia and Italy, and the younger, like the United States and Canada. But the fact and the causes

are nearly the same everywhere. Distribution differs, it is true, according to political institutions, as, for instance, between Germany and England. There is a comparative absence of extreme poverty in Germany as contrasted with England and the United States; and a comparative prevalence of poverty in Russia and Italy; and a comparative frequency of extreme opulence in Holland. Professor Pareto has found that, as between different countries, for which statistics are available, and as between various periods of time, the statistical inequalities in the distribution of wealth have maintained a remarkable correspondence, more close, in fact, than statistics of mortality.

The causes which have produced the present inequalities of wealth are largely historical, that is, lie in the past. It usually takes more than one generation to affect greatly the economic standing of a family. For this reason some people have foolishly imagined that if to-day we could once correct the inequalities in wealth handed down to us from the past, the problem would be solved, and with a new and even start we would be forever rid of great poverty by the side of great wealth. We shall soon see, however, that if wealth were once equally divided, it would not stay so. The analysis of what would happen will serve as the best introduction to our study of distribution.

§ 6. Equality of Distribution an Unstable Condition

Let us suppose that, through some communistic or socialistic law, the wealth in the United States were divided with substantial equality. It is proposed to show that this equality could not long endure. Differences in thirft alone would reëstablish inequality. We cannot suppose that human nature could be so changed and become so uniform that society would not still be divided into " spenders " and " savers," much less that different people would all spend or all save in exactly the same degree. So long

as there are any differences whatever between people in regard to their " rates of impatience " under like conditions, there will immediately ensue differences in saving or spending. It requires only a very small degree of saving or spending to lead to comparative opulence or poverty, even in one generation. It is remarkable how much may be saved in a lifetime by thrift. Cases are sometimes found of day laborers who, by saving and putting at interest, accumulate within a lifetime a small fortune, and in the meantime rear a family. As Micawber said, a man with an income of one pound a week will reach poverty if he spends just one penny more, and reach opulence if he spends just one penny less.

The larger the amounts saved or spent, the more rapidly is a fortune gained or lost. As we have seen, the process by which individuals thus gain or lose fortunes by saving or spending consists, in the last analysis, of an exchange of present and future income. If two men have to start with the same income of $1000 a year, but one has a rate of time-preference above the market rate of interest and the other has a rate below, the first will continue to get rid of future income for the sake of its equivalent in immediate income, and the other to do exactly the opposite. Such substitutions of immediate for remote, and of remote for immediate, income may take place by means of loans, sales, or changed uses of capital. The man with spendthrift tendencies will borrow, *i.e.* pledge future income for the sake of present income; or he will sell any durable goods which offer remote income, such as farms or forests, and buy perishable goods which offer immediate income, such as champagne, clothing, horses, and carriages; or he will change the uses to which he puts his capital, avoiding those which require improvements, and choosing instead those on which he can realize quickly, thus letting his property run down.

The man with saving tendencies, on the other hand, will lend or invest present income for the sake of future, will

sell perishable and buy durable goods, and will make far-sighted uses of his capital. As we have seen, both men will pursue their respective policies up to the point where their marginal rates of impatience harmonize with the rate of interest.

As we have seen, the rates of impatience among different individuals are equalized in these ways. In the case of an individual whose impatience to reduce income is unduly high, we found that generally he contrives in some way to modify his income-stream by increasing it in the present at the expense of the future. We were then intent on studying this phenomenon only on the side of income; but the effect on capital can be easily seen by applying the principles of Chapter VII. If a modification of the income-stream is such as to make the present rate of realized income exceed the "standard," capital is being depleted to the extent of the excess, and the person will grow poorer. Individuals of the type of Rip Van Winkle, if in possession of land and other durable instruments, will sell or mortgage them in order to secure the means for obtaining enjoyable services more rapidly. The effect will be, for society as a whole, that these individuals who have an abnormally low appreciation of the future and its needs will gradually part with the more durable instruments, and that these will tend to gravitate into the hands of those who have the opposite trait.

The central rôle is thus played by the rates of preference for present over future income and the rate of interest. The existence of a general market rate of interest to which each man adjusts his rate of preference supplies an easy highway for the change in his capital in one direction or the other. If an individual has spendthrift tendencies, their indulgence is facilitated by access to a loan market; and reversely, if he desires to save, he may do so the more easily if there is a market for savings. The irregularities in the distribution of capital are thus due in part to the opportunity to effect

exchanges in the parts of the income-stream located at different times. The rate of interest is simply the market price for such exchanges. By means of this market price, both those who wish to barter present for future income and those who wish to do the reverse may satisfy their desires. The one will gradually increase, and the other gradually diminish, his capital. If all individuals were hermits, it would be much more difficult either to accumulate or to dissipate fortunes, and the distribution of wealth would therefore be much more even. Inequality arises largely from the exchange of income, carrying some individuals toward wealth and others toward poverty. In short, the inequality of wealth is facilitated by the existence of a loan market. In a sense, then, it is true, as the socialist maintains, that inequality is due to social arrangements; but the arrangements to which it is due are not, as he assumes, primarily such as take away the opportunity to rise in the economic scale. On the contrary, they are arrangements which facilitate both rising and falling, according to the choice of the individual. The improvident sink like lead to the bottom. The provident rise to the top.

But thrift, important as it is, is not the only road to wealth, nor thriftlessness the only road to poverty. Besides differences in the rates of time-preferences, there are equally potent differences in ability, industry, luck, and fraud. By ability is meant one's *capacity* to earn, by industry the *use* of this capacity. Examples of getting rich from ability and industry are very common. Almost all the rich men in this country who have made their fortunes have done so, in part at least, through ability and industry. Often luck has added greatly. There are many examples of miners who got rich in Colorado by simply stumbling on a gold mine. Luck plays a larger rôle in the accumulation of fortunes than many are inclined to believe. The "unearned increment" is usually a case of luck. Unforeseen increase in ground rents has often given rise to large for-

tunes from time immemorial. It is also unfortunately true that some men have really got their start, if not their larger accumulations, through fraud. This has sometimes occurred through "high finance," which consists very largely in making contracts with one's self. If a man can own or control the majority stock in a corporation, and then make a contract to buy materials of himself at any price he sets, he naturally can make money. Also through political "graft," and especially through getting city franchises for gas and waterworks and street car companies, and through special tariff legislation, many men have become wealthy. Poverty, on the other hand, has often resulted not only from thriftlessness, but from incompetence, *i.e.* lack of ability, slothfulness (lack of industry), and misfortune or bad luck, and from having been defrauded by others.

We conclude, therefore, that equality of wealth is an unstable condition and, even if once established, would not endure, because of the unequal forces of thrift, ability, industry, luck, and fraud.

But inequality once established tends, by inheritance, to perpetuate itself in future generations. The workman who accumulates a few thousand dollars from nothing makes it easier for his children to accumulate more. He gives them a start or a "nest egg." Recently four sons of a Connecticut farmer met in a family reunion. Many years ago the father had sent them into the world to make their fortune, giving each $700 to start with. When they met at the recent family reunion, all were worth thousands. Hetty Green is an example of a person who inherited a large fortune and then accumulated, by her low "rate of impatience" or preference to accumulate for the future rather than to spend in the present. A fortune of $6,000,000 was bequeathed her, and now her fortune is reputed to be worth $100,000,000.

Likewise poverty may be passed down from generation to generation. A special cause for handing down inequal-

ity of fortunes lies in the reduction of the birth rate among the rich. As we have explained, the tendency to-day is for the poor to have a high birth rate, and for the rich to have a low birth rate. There results a tendency toward an increase in the numbers of the poor and a decrease in the numbers of the rich. This result tends to exaggerate the differences in the per capita wealth between the two classes, for in the upper classes there will be an increasingly larger share for the few who inherit fortunes, and in the lower classes there will be an increasingly smaller share for the many. We see, then, that there is at least a *tendency* for the rich to grow richer and the poor to grow poorer. We may even go so far as to say that the richer a man or family becomes, the easier it is to grow richer, and that the poorer a family becomes, the more difficult is it to keep from growing poorer. Large fortunes often grow without effort. All that is necessary is for their owners to refrain from squandering. On the other hand, a family once caught in poverty is apt to be drawn deeper into the mire. Overwork, anxiety, and unsanitary surroundings bring on disease or disability, which robs them of what little they once had. The opportunity of the wealthy is their wealth, and the curse of the poor is their poverty. "To him that hath shall be given, and from him that hath not shall be taken away even that which he hath."

§ 7. The Limits of Enrichment and Impoverishment

..Yet there are limits to enrichment and impoverishment. The ordinary downward limit is reached with the loss of all capital except the human person itself. When a man has succeeded in losing all his capital except his own person, the process usually comes to an end, because society, in self-protection, decrees that it shall go no farther. But where there is no such safeguard, the unfortunate victim may sink into even lower stages of debt servitude, as in the

Malay Archipelago or Russia, and to some extent in Ireland; or they may even sell themselves or their families into slavery. In most countries the poor come to be a large and permanent as well as a helpless class.

Next, as to the upper limit. We have seen that the opportunity to increase one's wealth depends upon the market for present and future goods, that is, the loan and investment market. A hermit cannot become immensely wealthy; nor can any of the inhabitants of a small island, if cut off from the rest of the world. The utmost that a man in an isolated community can own is the capital which that community has or can get — its land, dwellings, means of locomotion, and manufacture, etc. These are necessarily limited by the size of the community. As the market widens, the limits to the growth of large fortunes widens also. To-day there is no limit to what one man may accumulate except that he cannot more than "own the earth."

This relationship between the possible size of individual fortunes and the size of the market to which the owner of the fortunes has access is important. Practically it means that in these modern times, when almost the whole world is one great market, the possibilities of individual fortunes are greater than ever before. Few people realize this fact; for most people imagine that at any time in the world's history any fortune "could increase at compound interest." But a fortune is capital value, and, as we have seen, capital value has no power to produce income, but, on the contrary, is merely the discounted value of anticipated income. The only way a man's fortune can increase at compound interest is by his constantly reinvesting income as it comes in; that is, exchanging it for other and later income at the discounted values of the latter. But evidently he must find sellers of some such other and later income before he can buy it, and he must find purchasers of the income which he would fain sell. His income has no power whatever of

itself to create other income. The only way to reinvest his income is to find a market for it, and one in which other and later income is for sale. In short, an extreme upper limit to the growth of any individual fortune is set by the scarcity of investments.

The common idea that "money has power to breed money" leads to absurdity when applied to compound interest. Were it true, any person might leave fortunes to posterity far exceeding the possible wealth which this earth can hold. The prodigious figures which result from reckoning compound interest always surprise those who make the computation for the first time. One dollar put at compound interest at 4 per cent would amount in one century to $50, in a second century to $2500, in a third century to $125,000, in a fourth century to $6,000,000, in a fifth century to $300,000,000, in a sixth century to 15 billions, in a seventh century to 750 billions, in an eighth century to 40 trillions, in a ninth to 2 quadrillions, and in a thousand years to 100 quadrillion dollars. Now the total capital in the United States is only about 100 billions, and that in the world at large — even assuming that the per capita wealth elsewhere is as large as the United States, which is an absurdly large allowance — would be less than 2 trillions, which is only one fifty-thousandth part of what we have just calculated as the amount at compound interest of $1 in 1000 years. Yet 1000 years is only half the time since the Christian era began. In 2000 years the $1 would amount to 100 quadrillion times 100 quadrillion, which is many, many times as much as a world composed of solid gold. Needless to say, such a prodigious increase of wealth could never actually take place, for the simple reason that this is a finite world. The difficulty lies, not simply in the reluctance of people to provide for accumulation several centuries after their death, but also to the fact that large accumulations would reduce the rate of interest. The attempt, for instance, to invest trillions every year would

drive up the prices of all investible property, *i.e.* all capital. To invest such sums would practically require the purchase by the rich man of all existing railways, steamships, factories, lands, dwellings, etc. But many of the present owners of these, having already sold a good deal and thus reduced their rates of impatience to equality with the prevailing rate of interest, would not part with more except at prices so high that the purchaser would make little or no profit or interest on his investment. Thus, the approach toward the limit of investment would *reduce the rate of interest* and retard, and finally altogether prevent, further accumulation.

There are a few examples of long-continued reinvestments. Benjamin Franklin at his death, in 1790, left £1000 to the town of Boston and the same sum to Philadelphia, with the proviso that it should accumulate for a hundred years, at the end of which time he calculated that at 5 per cent it would amount to £131,000. In the case of the Boston gift, it actually amounted, at the end of the century, to $400,000, and has since accumulated to about $600,000. The sum received by the city of Philadelphia has not increased nearly so fast.

Another interesting case of accumulation is that of the Lowell Institute in Boston, which was founded by a bequest of $200,000 in 1838, with the condition that 10 per cent of the income from it should be reinvested and added to the principal. A peculiarity of this provision is that it applies in perpetuity. There is, therefore, theoretically, no limit to the future accumulation thus made possible. The fund, after only 67 years, amounts already to $1,10[illegible],000.

§ 8. The Cycle of Wealth

With a world market for investment, we have every prospect of a great increase in private fortunes in the next few centuries. But practically the limit reached in the history

of most large fortunes is only a very small part of the high limit we have set, that of "owning the earth." There is usually a reaction against the desire to accumulate. Each reduction in the rate of interest tends to check the desire to accumulate. Moreover, this desire soon palls. A multimillionaire recently left his fortune to accumulate until 21 years after the death of his youngest heir with the intention of accumulating by that time the largest fortune on record. But his heirs much preferred to use it during their own lifetime, and succeeded in breaking the will. Even had they not succeeded, those who finally came into the fortune would probably have begun, at least in a few generations, to dissipate it. The effect of great wealth is to produce habits of spending.

It has already been noted that one's rate of preference for present over future income, given a certain income stream, will be high or low according to the past habits of the individual. If he has been accustomed to simple and inexpensive ways, he finds it fairly easy to save and ultimately accumulate a little property. The habits of thrift, being transmitted to the next generation, result in still further accumulation, until, in the case of some of the descendants, affluence or great wealth may result. But if a man has been brought up in the lap of luxury, he will have a keener desire for present enjoyment than if he had been accustomed to the simple living of the poor. The effect of this factor is that the children of the rich, who have been accustomed to luxurious living, and who have inherited only a fraction of their parents' means, will, in attempting to keep up the former pace, be compelled to check the accumulation and even to start the opposite process of the dissipation of their family fortune. In the next generation this reverse movement is likely to gather headway and to continue until, with the gradual subdivision of the fortune and the increasing reluctance of the successive generations to curtail their expenses, in the

third and fourth generation there comes a return to actual poverty.

Wealth is usually inherited in the United States in amounts equal for all the heirs, so that a fortune of $10,000,000, for instance, if left to 10 children, will be divided in amounts of $1,000,000 apiece. That being the case, the fortune will reduce itself to $\frac{1}{10}$ per capita. Now, the children of the multimillionaire, who dies leaving a fortune of $10,000,000 to 10 children, each receiving $1,000,000, will probably have handed down to them a taste or habit for spending which will make them belong to the class of spenders rather than savers. They have been brought up in a family which has spent the income from $10,000,000, and each one now finds that he is left with the income from only $1,000,000, which is far less than he has been accustomed to see used by his parents. Trying to keep up the standards of the family in which he was reared, unless he happens to have the necessary thrift, ability, industry, luck, or fraud to add to the $1,000,000, the result will be that his fortune will diminish. One generation after another will reduce the original fortune to diminishing fragments until there is nothing of it left. And then the unfavorable effects of luxury begin. A few years ago an English physician came to this country who had inherited a large fortune; but he had also inherited the desire to indulge himself in the present to the full extent of his capacity. As a result of this desire, his parents, in leaving their wealth to him, had left him only the income "in trust" (and it is not an unusual thing in England, where there are spendthrift sons, to leave property so that they may be able to use only the income). Nevertheless, this man contrived, by chattel mortgages and in other ways, to spend a good deal more than his standard income, and he was always in debt and in trouble. The result of such ways is sooner or later what is called a "shabby genteel" class. Eventually people in this class will have to overcome their pride, go to work,

and become laborers — and often common laborers. Their wealth-holding ancestry is forgotten.

Thus the limits to the possible growth of large fortunes set by scarcity of investments is always far higher than the vast majority of fortunes ever approach. Most fortunes rise and then fall, the turning point being due to the abandonment of thrift and the substitution of thriftlessness which the fortune itself sooner or later engenders. An old adage has put this observation in the form, "From shirt sleeves to shirt sleeves in four generations." We have no inheritors to-day to the fortune of Crœsus, who, in his day, was supposed to be a wealthier man than Rockefeller, not only in proportion to the wealth of his time, but absolutely. A man with a start of that kind ought to have been able to make the fortune increase rather than decrease with the future, and yet we know of no heirs to that fortune. To-day we have a large number of wealthy families in this country, but most of them are *only one generation old!* Thus the very rich families, so far from growing rich indefinitely, usually do not even continue more than a few generations rich, but grow poor, arriving, too, at the condition of poverty without the vitality or the character necessary to retrieve their lost fortunes.

Likewise at the opposite extreme, it does not always happen that the poor grow poorer or even remain poor. Just as wealth relaxes thrift, poverty stimulates thrift. The children of the poor often become fired with ambition to get on in the world simply because they are poor. These people often rise from the ranks, and rise rapidly. It should be noted, however, that unlike the downward moment of large fortunes — this upward movement is the exception, not the rule. It may be that 90 per cent of large fortunes pass their maximim and decline, but only 1 or 2 per cent of the poor pass their minimum and rise. Many fall into pauperism or die. The vast majority simply remain poor. We see, then, that while it is very easy for those who have

once reached the top of the economic strata to stay at the top, this seldom happens chiefly because of their conversion from savers to spenders; and while reversely it is very easy for those who once reach the bottom to stay at the bottom, they do not always do so, chiefly because of their conversion from spenders to savers.

§ 9. The Actual State of Distribution

The resultant churning up of society neutralizes the tendency we have mentioned for the rich to grow richer and the poor to grow poorer and, what is more important, it prevents — to some extent — the establishment of wealth-castes by changing the personnel of wealth and poverty. The individuals of society are like goldfish in an aquarium. Those once started upward continue to ascend for a time, when they start down again. Those once started downward continue to descend until perhaps they reach the bottom, when they (may) start up again. To complete the figure, we must suppose the shape of the aquarium to be like a bell, very small at the top and very large at the bottom. There is room for only a few at the top, and the struggle of many to get there makes it difficult for any, while it makes it easy for all to descend. There is the most room at the bottom, and consequently there is less change there than anywhere else. Reversely, at the top there is most change. The constant changing of position in this bell jar, while of great moment to the individual, does not greatly affect the distribution of society as a whole. There will always be about the same proportion of fish at each successive stratum. Professor Pareto has, in fact, represented the distribution of wealth by a bell-shaped figure which he calls the social pyramid. This is shown in Figure 48. The number of people having an income between Oa and Ob is represented by the volume comprised in the bell-shaped figure between the plane of $a'a''$ and the

plane of $b'b''$. The social pyramid represents the fact that the larger the size of a fortune the smaller the number of people who have it. The breadth of the pyramid represents the number of people who have no capital except their own persons. As the capital rises in amount, we find we have fewer and fewer people. We have no exact statistics for this country, but a rough popular estimate states that over half of our population have incomes of less than $600, and of the remaining half about half, enjoy incomes between $600 and $1200, and the other half incomes over $1200.

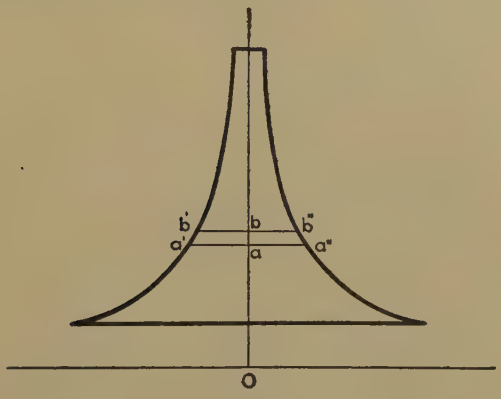


FIG. 48.

The frequency of changes in fortunes, whether up or down, will differ greatly in different countries according to their age, and their laws and customs. Among these factors the laws and customs as to wills is of great importance. If there is an equal distribution among the children of the rich, the fortune is pretty sure to run itself out in a few generations or centuries, but in England this result is prevented by giving to the oldest son the bulk of the estate and cutting everybody else off with small stipends. The idea in this case is to maintain the family dignity and pride, and the integrity of the large estate. In this country

there are signs that we are gradually changing toward this English custom by which a rich man, instead of dividing his fortune evenly, leaves the bulk of it to one of his heirs. By such a change in the custom of willing property there will be a new and powerful tendency for existing inequalities of wealth to be accentuated and perpetuated.

§ 10. The Problem of Wills

One of the special problems connected with wills is the problem of the extent of control a man should be allowed to exercise after he has died. This problem has frequently been under discussion. It is sometimes called the problem of "the dead hand." The "statutes of mortmain" in England grew out of this problem; also the common law rule that no testator can "tie up" his estate beyond "lives in being" at the time of his death plus 21 years. This rule applies, however, only to so-called "private" bequests. To escape its operation and perpetuate his fortune a rich man very often leaves it to some "charitable" foundation. But as it is ill advised to leave a fortune in the hands of persons for a number of generations, so it has been found ill advised to leave fortunes in perpetuity in any shape. For the result is that after a few generations it is impossible to carry out the instructions of the donor without doing harm — however good his intentions. Conditions will have come about which the donor could not foresee or provide for. In Norwich, England, for instance, there was left many generations ago a small sum to support a preacher for the Walloons, who should utter a sermon in Low Dutch every year at a certain time. That provision is still carried out, although there are no longer any Low Dutch in this place. There is no one to understand the sermon, and yet it is preached every year. Recently the preacher has learned a sermon by heart and repeats it every year in order to receive his remuneration.

A few years ago a lady died in England and left a fortune to be used for the teaching of the doctrines of Joanna Southgate. This woman died in 1862. Now Joanna Southgate had had a large religious following in England, but at this time there was not a single soul in England who believed in her doctrines. We had the curious spectacle, therefore, of a fortune being left in the hands of trustees, no one of whom could be found who believed in these doctrines. In 1587 a certain man died leaving to the almshouse of Suffolk some real estate the income of which was then £113. The income at present is £3600 and the trustees do not know what to do with it. The result has been to make the almshouse a mecca for all poor people for miles around and to pauperize the neighborhood.

The custom of making wills is one that is handed down to us from the Roman days. There were no laws in ancient Germany, no laws in the Levitical laws of the Jews, none among the Hindus, and only slight traces among the ancient Greeks, regarding wills. When we talk of the sacredness of private property and the right to dispose of it by will, we are merely expressing our loyalty to the particular custom under which we happen to live.

It may be in the future that a remedy for some of the present evils connected with the ownership of wealth may be found by limiting or regulating the inheritance of wealth as to time or amount; by inheritance taxes, by limiting private ownership in certain perpetuities, by substituting leaseholds for perpetual franchises or for "fee simples" in mineral lands or even in all lands. There is much to be said on both sides of these proposals, but it is no part of our present task to enter upon their discussion.

CHAPTER XXVI

WEALTH AND WELFARE

§ 1. True and Market Worths

An often-quoted passage from the Bible states that "the love of money is the root of all evil." Another states, "it is easier for a camel to go through the needle's eye than for a rich man to enter into the kingdom of heaven." On the other hand, poverty has always been regarded as an evil. Agur prayed that he should be given neither riches nor poverty. This is the theory of the golden mean. Still another view is that while, absolutely, wealth is good and the more of it per capita the better, yet its unequal distribution is an evil. This is the view of the socialists.

In all these views there is some truth. Extreme wealth and extreme poverty are alike evils, and the disparity between the extremes is also an evil. Moreover, besides these evils dependent on the *quantities* of wealth are other evils dependent on the *qualities* of wealth. But how can it be that wealth, which is merely the physical means for satisfying human wants, can ever do harm? We have escaped this question hitherto because we have accepted wealth, so to speak, at its market valuation. As was explained at the outset, prices are determined by the actual desires of men, and, when seeking to explain prices as they are, it was no part of our task to inquire as to whether the desires which explain them are foolish or wise, good or bad, desires. There was no need to distinguish between the desires which fix the prices of bibles and those which fix the prices of ob-

scene literature. We now propose to go a little deeper and to point out instances in which desirability is not intrinsic utility, and in general to point out the various ways in which market valuations fail to give a true picture of actual worth.

In the first place, as we have seen, market valuations of fortunes do not even show their comparative desirabilities because of the wide differences between the marginal desirabilities of money of different people. As already pointed out, the marginal desirability of money decreases rapidly with an increase of wealth, so that — beyond a comfortable competence — the addition of millions means little that is really desirable. In fact, to some men like Mr. Carnegie swollen fortunes become a burden and responsibility rather than an addition to personal gratification. In other words, the desirability of opulence is small.

§ 2. Evils connected with the Quantity of Wealth

That extreme poverty is an evil needs no proof. We shall, therefore, not discuss the problem of poverty. The chief causes of poverty we have already shown, and its remedies lie beyond the scope of our discussion. Suffice it to say that the problem is the greatest of all practical economic problems and is justly claiming a large share of the attention of philanthropists and reformers. Among the remedies or partial remedies suggested are socialism, old-age pensions, compulsory workmen's insurance, regulation of hours of labor, better housing, abolition of disease, education in thrift, profit-sharing, coöperation, monopolization and regulation of labor by trade unions.

At the opposite extreme lie the opposite dangers and evils of great wealth. If the poor are too hard working, the rich are too idle. If the poor are underfed, the rich are overfed. If the poor have the discomforts of squalor and shabbiness, the rich have the discomforts of excessive style.

If the poor suffer from scanty clothing, the rich suffer from tight lacing and high-heeled shoes. If the poor suffer from overcrowding, the rich suffer from the burden of overgrown establishments. If the poor drink alcoholics to get rid of fatigue, the rich also drink to get rid of *ennui.*

Not only each extreme has its evils and dangers, but unequal distribution of wealth has evils and dangers. One of these is the perverted use of great wealth in a manner to humiliate, degrade, or demoralize the poor. Unequal distribution of wealth produces a caste feeling, breeding contempt for the poor by the rich, and envy of the rich by the poor. Corresponding to differences in wealth grow up differences in the mode of living, education, language, and manners, differences which distinguish the " gentleman " and " lady " from the common herd, and which gradually become confused with innate differences, which are quite another matter. Aristocracies are almost always founded on wealth and are therefore almost always on a false basis. There are undoubtedly wide differences between men. If so-called aristocrats were really all the name would imply, the " best " in body, mind, and heart, much could be said in favor of their segregation from the " vulgar " crowd, and the development from them of a better race of men. But a plutocratic aristocracy is based, not on what men are in themselves, but on what they possess outside of themselves.

Because of the differences in wealth, the poor serve the rich. The relation of master and servant is not simply a commercial relation. It also represents a supposed difference in caste.

Probably the worst demoralization of the poor, growing out of inequalities of wealth, is the prostitution of the daughters of the poor for the sons of the rich. All students of prostitution are agreed that it rests on this economic basis. For the white-slave traffic most people are blaming those who engage in it, just as for drunkenness most people blame the saloon keeper. Doubtless these agents have

their share of moral responsibility. Yet they are merely the brokers in the business. The demand and supply are the important factors, and the demand and supply arise chiefly because of the unequal distribution of wealth.

Next to the poor selling their souls comes selling their votes. Bribery and political corruption are largely due to differences in wealth. In a democracy we have the ideal conditions for such perverted uses of wealth. In a democracy there are two great powers, the power of the ballot and the power of the purse. The power of the ballot rests with the poor because of their numbers. The power of the purse rests with the rich. Nothing could be more natural than that the unscrupulous representatives of these two powers should contrive to get together for mutual advantage. They need not meet directly. The perverted politician intervenes as a broker. Many of the city governments of the United States exemplify this condition. These politicians make, on the one side, a business of controlling the votes of the poor, partly by bribery, partly by dispensing "charity," and partly by activity in party organizations; and, on the other side, they make a business of "holding up" the capitalists who want franchises for street railways, water, gas, electric light, or telegraph or special tariff legislation. The unscrupulous capitalist finds it advantageous to pay toll to the politician, either by actual bribery or by stock in corporations, or by what a politician recently called "honest graft" in the form of "tips" or inside information as to the stock market, real estate transactions, etc. Similarly, in our state legislatures and even in our national Congress, politicians are of this character. Some are avowed or secret representatives of capital or "the interests"; others of voters or "the people." In this case the conflict between plutocracy and democracy becomes more direct and visible. But it always exists, and will continue to exist in some form unless one of the two powers should completely vanquish the other.

§ 3. Forms of Wealth Injurious to the Owner

We have seen several of the evils, and in particular some of the misuses, to which wealth may be put. We can better understand the nature of these and other misuses if we reëmphasize the fact that the wealth, which is commonly measured in money, does not include the most important item of wealth there is—human beings. The evils of wealth consist largely in an increase of external wealth at the sacrifice of personal wealth — in this deeper sense of the word "personal." Emerson said "health is the first wealth." The founder of Christianity asked, "What profiteth it a man if he gain the whole world and lose his own soul?" Many a millionaire would willingly give all his money for youth, health, or even freedom from pain. Many uses of external wealth practically injure our personal wealth. The injury may be physical or moral or both. It is in this regard especially that "satisfactions," in the economic sense, fails to measure real welfare. Indeed, as regards the body, we may classify satisfactions into self-benefiting and self-injurious. Many articles of wealth, though possessing commercial value, are really injurious to those who use them. In some cases the articles of wealth referred to are used almost exclusively by the rich, in others almost exclusively by the poor. Among examples of self-injurious satisfactions or uses of wealth are the consumption of food or the wearing of clothing or the use of dwellings injurious to the health, the practice of unhygienic or immoral amusements, the use of narcotics, such as opium in China, hashish in India, absinthe in France, whisky in Ireland, and alcoholic beverages in western civilization generally. These may be called perverted uses of wealth, but they are very common, so common as to give commercial value by millions of dollars to disease-producing food factories, distilleries, saloons, dives, gambling houses, low dance halls, and theaters, houses of prostitution, immoral and degrading

literature. The perverted satisfactions here represented are capitalized like any other satisfaction. They are often paraded to show how wealthy a nation is, but as they weaken the stamina of the people and shorten their lives, they really lessen the satisfactions in the end. In any complete view of the subject they should be recognized as sources of national weakness, not strength. This is recognized in the great reform movements — housing reform, temperance reform, the movement to abolish the "white-slave" traffic.

§ 4. Forms of Wealth Injurious to Society

Other evils of wealth consist in its use by one person to injure another. Just as we classified some satisfactions into personally beneficial and injurious, so other satisfactions may be classified into socially beneficial and injurious. Examples of socially injurious satisfactions are of many kinds. Robbery, fraud, embezzlement, arson, and other criminal acts are too obvious to need more than mention. A burglar's "jimmy" is an article of wealth to the burglar, but it nevertheless is a means of injury to society.

Of less obvious examples one is the exploitation of gold mines when their product depreciates the currency. Except so far as gold is used as an ornament, or in the arts, its production at a sufficiently rapid rate, tends to raise prices. Here we find great gold fields, stamp mills, assay and smelting works, etc., standing in our accounts as important items of national capital. Yet in the last analysis they are injurious, rather than beneficial, to the country. While they afford means and opportunities for their individual owners and exploiters to make great private fortunes, they do not enrich a nation or the world; for their sole effect is merely to change the numbers in which prices are expressed. Thus the labor and capital invested in gold mines may be said to be socially wasted. A small amount of money is

as good a medium of exchange as a large amount. In fact, if the gold flows out of the gold mines fast enough to raise prices, the result is social harm rather than good : for it disturbs the distribution of wealth and continually tends to precipitate a crisis.

The gold miner's fortune is thus made not as an addition to the world's real wealth, but by an abstraction from the world's wealth for his benefit, with secondary effects more or less injurious. The gold miner, as it were, robs society. Thus, even the most genuine gold brick, in which there is no thought or intent to defraud, may prove in the end an unconscious swindle.

Other examples of socially injurious wealth are such nuisances as the " smoke nuisance " and " pests " of various kinds. A factory which defiles the household linen and the lungs of the neighborhood is not an unmixed benefit. If all the injury it caused could accrue to the factory owner, he would put in a smoke consumer, or else most willingly suffer a great deduction in the value of his plant. Instead, he causes a great loss of value thinly distributed over blackened houses and an injury never capitalized or measured in the health of his fellow citizens. Such cases, where social interests and individual interests do not run parallel, justify legal interference. We cannot allow bonfires in a crowded city, nor freedom of movement on the part of those carrying infectious diseases.

§ 5. Forms of Wealth used for Social Racing

The other examples of socially injurious uses of wealth we shall mention are all cases of social rivalry. Three special cases will be considered.

The first relates to warfare and the preparation for war. It is usually conceded that actual warfare is economically injurious. The best that the apologists for war can say is that it is inevitable. But it is not so well recognized

that the economic preparation for war is an example of world waste, albeit an effort toward economy on the part of each individual nation. When Germany invested millions in armaments, she merely stimulated France to do the same. They have been racing with each other ever since, as have other countries, including England and the United States. Each battleship which costs $10,000,000, in the end adds practically nothing to the world's wealth. On the contrary, as soon as a similar battleship is added to the navies of rival powers, the various nations are in precisely the same relative position as before any battleships were built at all. Preparation for war is a species of cutthroat competition. If six world powers, instead of investing each $10,000,000 in a battleship, should agree not to do so, the result would be to save $60,000,000 from being wasted. The case would be very different if the ships belonged to the merchant marine. In that case, the building of $60,000,000 worth of ships would add that much to the world's productive capital. The ability of merchant ships is absolute, that of battleships is relative. The only object in one nation's building a battleship is to increase its strength relatively to other nations. Just as soon as this move is met by the other nations, all the advantage which it was sought to gain is lost again.

Thus, for the most part, the " capital " of nations, in the form of armaments, represents economic waste, although no one nation could afford to dispense with it as long as other nations do not.

Our second example of socially injurious rivalry is commercial cutthroat competition. We have seen that what is often to the interests of individual producers is against the common interests of producers as a group. We may now add that it may be injurious to the interests of society as a whole. In fact, we have already noted that a patent and copyright have their justification in the fact that the play of unprotected individual interests would practically re-

sult in discouraging or suppressing inventions and books. The same must often be true in many other instances. Telephone competition is not only injurious to the telephone companies but to the subscriber, who either has to have two or more telephones in his house, with all the expense and annoyance which that implies, or has to lack proper and easy connection with subscribers to other systems than the one he employs.

§ 6. Wealth for Vanity

Our third example of socially injurious rivalry is perhaps the most important and pervasive, although the most subtle of all. It concerns rivalry in wealth itself, and introduces us to the subjects of luxury, extravagance, social ambition, and vanity. Thackeray's novel, "Vanity Fair," is a satire on the sort of economic rivalry referred to. Vanity may be defined as a desire to obtain the approval of others, and vanity leads to social rivalry. This may be considered as rather a broad definition of vanity, and it is one which does not necessarily imply any slur, although most desires which are desires of vanity are subject to criticism or question. The important part played by vanity in economic affairs is seldom realized. A case of pure vanity is seen when a man wants merely the badges of distinction. For instance, the badge of the Legion of Honor which Napoleon established in France is much desired, merely as a means of obtaining the approval of other people. It has no intrinsic desirability. It is not because it is beautiful that it is desired; it is not because the badge can keep one warm or appease one's hunger or fulfill any of the primitive and individual desires of men. It merely appeals to the instinct to attain distinction in the eyes of other people. But most cases of vanity are not so pure, but are mixed with a substratum of actual utility. For instance, a diamond is desired chiefly out of motives of

vanity, but it is desired also because it appeals to the æsthetic sense. It is a curious fact that as soon as we mix vanity, with some other motive, people begin to hide behind this other motive and conceal the vanity of which, for some reason, they seem to be ashamed. When a woman wears a diamond hatpin, and can never, by virtue of its position, see it herself, what motive is there except vanity? Of course it may be said that she is an altruist in attempting to provide an article of beauty forother people to admire; but the real object, however she may condone or conceal it, is to display this diamond to other people and to show thereby that she is able to possess it. Most articles of ornament pander chiefly to this mode of vanity and come into existence largely and chiefly for this reason, although the admiration of actual beauty is a secondary element and a subterfuge.

The amusements of mankind are almost always, or to a large extent, mixed with the motive of vanity. For instance, automobiling to-day is not always indulged in for the sake of sport alone, but also for the sake of display. Equipages have always been one of the means of displaying wealth. Narcotics have always been objects desired not merely for their drug effect, but also for the effect of display. The habit of using fine wines and expensive drinks in entertaining has long been one of the methods of social display. Clothing, even, and housing, are very often objects of vanity. In fact, historically, clothing originated as ornaments, like jewelry, rather than as an actual protection from the weather. Even food is a matter of vanity to a certain extent. Feasts have been favorite occasions for the exercise of this instinct.

A few extreme examples of ostentation will help us to understand the nature of vanity. Some years ago there was an American in Florence who carried the idea of display in his equipage to the extreme of getting a chariot and having sixteen horses to pull him through the narrow streets

of the city. Ordinarily an attempt to gratify vanity results in the approval which is sought by the individual, but in extreme cases like this it often results in disapproval, and this man was known in Florence for years as "that fool American." A well-known French count, who through marriage became possessed of means, gratified the instincts of vanity by proceeding to spend untold sums in building a large and useless colonnade of pillars, simply to show that he was able to do so. A person not long ago left a will providing $1,000,000 for the erection of his own tomb. Cleopatra once showed what she could afford by drinking a dissolved pearl. Pliny shows that after Cleopatra did this she was imitated by the son of a famous actor, and the practice of drinking pearls became a sort of fashion in Rome, as to-day some men of a less subtle vanity light cigars with $5 bills. It was probably this practice which led to the phrase "money to burn." In Philadelphia not very long ago a lady had a carpet made with a special design, and when the carpet was completed she was careful to have the design destroyed lest any one else should have a carpet like hers. A well-known speculator is said to have bought for his wife for $30,000 a particular pink, in order that it might be called by her name. In Holland, centuries ago, there was a furor over tulip bulbs which took such a hold on the people that it led to extravagantly high prices for these symbols of vanity. In 1639 one bulb sold for what would be approximately $2000 in our money.

Another instance is found in the admiration people have for foreign importations. Many people really delude themselves with the idea that they care for an imported cigar or wine because they believe the article to be superior to the domestic article. Nor is this the only species of vanity appeased by the purchase of foreign goods. An art dealer in San Francisco found that people there preferred to pay $4000 in Paris for the same picture which they could buy in San Francisco for $2000, in order that they might

state that they bought it in Paris. The artists of San Francisco found it advisable, therefore, to take their pictures to Paris, in order that they might get a higher price from Americans. Not long ago an American who lives in a well-known cheese-making district in New York paid a very high price for an imported cheese and took great delight in the fact that it was imported. As a matter of fact, it had first been exported from his own town. There is said to be a large industry in the exportation of cheese, the same being naturalized abroad and sent back to this country and sold as foreign cheese. When the English tariff on French wines made their price higher in England than in France, and the French tariff on English intoxicants raised their price in France, the higher classes in France would consume the English article, and the higher classes in England would consume the French article, while both would not use the domestic article because it was too "common."

Jewelry has always been regarded as a matter of vanity. If a chemical method should be developed of making a *real* diamond cheaply, the desirability of diamonds would be destroyed; they would immediately go out of fashion. The invention would be self-destructive, and the price of diamonds and the use of diamonds destroyed. That is, diamonds are desired because they are scarce and a badge of economic power of the people who purchase them. This is why imitation jewelry is regarded as a sham. Paste diamonds may be quite, or nearly, as beautiful as real diamonds, but they can never be nearly as valuable. Those who use them do so not because they regard them as beautiful, but usually in order to make people believe they are "real" and that the possessor can afford to buy them. Sometimes they are worn as symbols of real diamonds kept for safety in bank vaults. The owners then appear at the opera with the imitation jewels. When spoken to of their jewels, these people will say that they are not real jewels, but are an exact imitation of real jewels which are in the

safe deposit vaults. In such cases the imitation jewels serve purely and simply as badges of ownership. There is then supposed to be no pretense involved. The wearers would be thought "cheating" if they possessed only the paste. Their virtue consists in actually having the "real thing," which the paste replica proclaims they can afford. A wealthy woman seriously argued the question of whether a poor woman had a right to wear an imitation diamond. Her thought was that, since the poor person could really not afford to have a real diamond, to wear the imitation diamond amounted to deceit.

§ 7. The Cost of Vanity

Now the efforts to satisfy vanity are like international armaments. The chief advantage that social racing gives to an individual is a relative advantage. But this implies that he puts other people to a relative disadvantage. The effect on society is to waste the cost of keeping up the race. This cost consists in the labor expended on the gratification of vanity, and shows itself in the high prices of articles for that purpose. The tax thus laid by society upon itself is enormous, and may be measured roughly by the annual purchases of articles of pure vanity. Yet people seldom complain, for the individual can see little or no difference between the good he gets from an article of vanity and the good he gets from any other article. He does not care much about the pace he may be setting others, and he does not hold any other person responsible for the pace which has been set him. He looks at the world's fashions as an inevitable fact, and adjusts his own actions to it. Our task, however, is to look at the social effects of his action on others, and of others' actions on him. His expenditures for vanity may give him the satisfaction of "climbing," but by as much as he gets ahead of others the others are left behind. They are all in a social race to get ahead. In the scramble all are at

great effort or expense, and in the end there is a loss of economic power similar to the loss of nations racing for military supremacy. Undoubtedly the race stimulates the racers, and may do them some good as a mode of exercising their abilities, and even lead to useful inventions. The same may be said of war. But our present purpose is to point out the cost, which is usually overlooked. If the true cost could be expressed in figures, it would doubtless amaze people who have never stopped to see the extent to which luxury and luxurious rivalry is carried. Almost all expenditure is more or less colored by it.

We have compared the extravagance which is created by the desire of a man to compete with his neighbor vanity to a race. We called it social racing. Now when fashion enters into the matter, as it almost always does, this *race* becomes more like a *chase*. There are leaders and followers, and the followers try always to overtake the leaders. When they do so, the leaders turn in their course in order to elude their pursuers. The consequence is that fashions are constantly changing at the hands of the leaders of fashion. The leaders of fashion are usually from among the richest people in the community, and whatever they consume, those beneath them in the social or economic scale wish to consume also.

We may take, as an example, the case of russet shoes, which are constantly coming in and going out of fashion. A few years ago a gentleman was surprised to find that only the highest grades of russet shoes were carried on the market. When he asked the reason, he was told that russet shoes had gone out of fashion only a year or two before; that now they were coming in, and the only way by which they could be got in was by putting the highest grades on the market first, because if the lowest and cheapest grades were put on, then the leaders of fashion would not want them, and if the leaders did not want them, then followers would not want them either. After this initiatory demand

has been satisfied, the shoes are imitated in cheaper grades, until finally russet shoes become so common that the leaders refuse to wear them longer and they go out of fashion — only to come back again in a few years, after which the same cycle is repeated.

One result of this constant search for inequality is often a pretended inequality. Consequently this constant social rivalry puts society on more or less of a false basis. There is a pretended inequality and an effort on the part of the so-called upper classes to assert a superiority, even in blood, over the so-called lower classes. It leads, in other words, to snobbishness and the caste system.

Vanity is literally insatiable. Without vanity there would be little use for the fortunes of multimillionaires. Beyond a modest fortune more money would be to them entirely superfluous. Therefore the use to which they put their millions is of much more moment to society than to themselves. If they use it to set standards of luxury, they are using it in a socially injurious manner. They produce the same effect on society as though they levied a tax on all persons poorer than themselves.

§ 8. Remedies for the Evils of Vanity

We have seen that the natural remedy for cutthroat competition in business is combination. In the same way if there could be a general "disarmament," as it were, or agreement between the social competitors, it might solve the problem of social racing.

This indeed has been done on a small scale in schools, colleges, and clubs. A good instance is among women's sewing circles. When such a circle is first organized, the hostess gives a very simple entertainment. At the next meeting a rival hostess gives something a little more elaborate and presently the members of the circle are madly racing in the effort to supply the best entertainment. A reaction

becomes necessary and the ladies finally agree explicitly, "not to serve more than two kinds of cake."

An example of how this general disarmament works was seen in San Francisco at the time of the earthquake. There the people who lived formerly on Nobb Hill in fine houses had to live in tents or out of doors. So far as this loss was concerned, it was no loss at all, at first at any rate, because each man was perfectly willing and liked to live out of doors, providing his neighbor lived the same way. But before the earthquake any one of these people would have been ashamed to live in a tent because he knew that his neighbors would wonder why he did not live in a house as good as theirs.

Very similar to social disarmament, is compulsion by the government. The Dutch government finally took a hand in the tulip-bulb craze because it was so heavy and foolish a tax on the national resources, and the traffic in bulbs was stopped. History contains many examples of sumptuary laws designed to check social racing.

One cure has been suggested by John Rae which is ingenious, although it has never been consciously put into use. He says, and wisely, that we cannot change this inherent ambition in human nature. All we can do is to turn it to some good account instead of letting it run to waste. He suggested that social racing could be made to yield a revenue to a government by taxing imported luxuries so as them expensive and therefore desired by the wealthy and their imitators. A case in point is that of the cheap wines of France being dear in England because of the tariff and cost of importation across the channel, and reversely, the cheap wines in England being dear in France. Each was fashionable in the country of the other. Now if a tax is able to create a fashion in this way, through making an article exclusive, the government gets a revenue by creating a fashion, so to speak, by making certain imported goods so rare that they become sought after as matters of fashion, so that the tax imposed on society by fashion is made to accrue to the government.

Another way is to change the fashion of fashion, so to speak, so that it may run into useful instead of useless rivalry. One of the better forms of vanity does not satisfy itself by display in the usual sense, but seeks to make a record of power in the financial world. In these days a man may advertise his wealth in other ways than high living. To be known as the largest stockholder in a railway is a distinction coveted by men. In fact, in spite of many evidences to the contrary, there are some indications that display, in the old sense, is decreasing, especially among men. To-day men seldom wear jewelry or gaudy clothing. Business distinction takes the place of these. Even women are becoming ambitious to lead in other ways than "society." They seek distinction at women's clubs or as executives in charitable effort. There is, as a matter of fact, no reason why rich men and women should not try to distinguish themselves by doing good, and the tendency in America to-day is exactly in this line. Rich men are gradually trying to distinguish themselves by their large benefactions instead of by their large expenditures. They create great philanthropic foundations and endow hospitals, sanitariams, libraries, and universities.

A few years ago, in the city of Pittsburg, two wealthy men vied with each other in attempting to display fine buildings for the good of the city of Pittsburg, and one, in order to triumph over his neighbor, who had put up imposing buildings in one square, purchased the square immediately adjacent at a very exorbitant price for the purpose of erecting a still finer building for the use of the city of Pittsburg.

Social racing of this sort may be socially beneficial and is an encouraging sign of the times. At present, however, great wealth is as a rule either running to waste or taxing those who cannot keep up with it. Perhaps some day it may — like other great wastes — be caught and harnessed and made to do some of the world's work.